

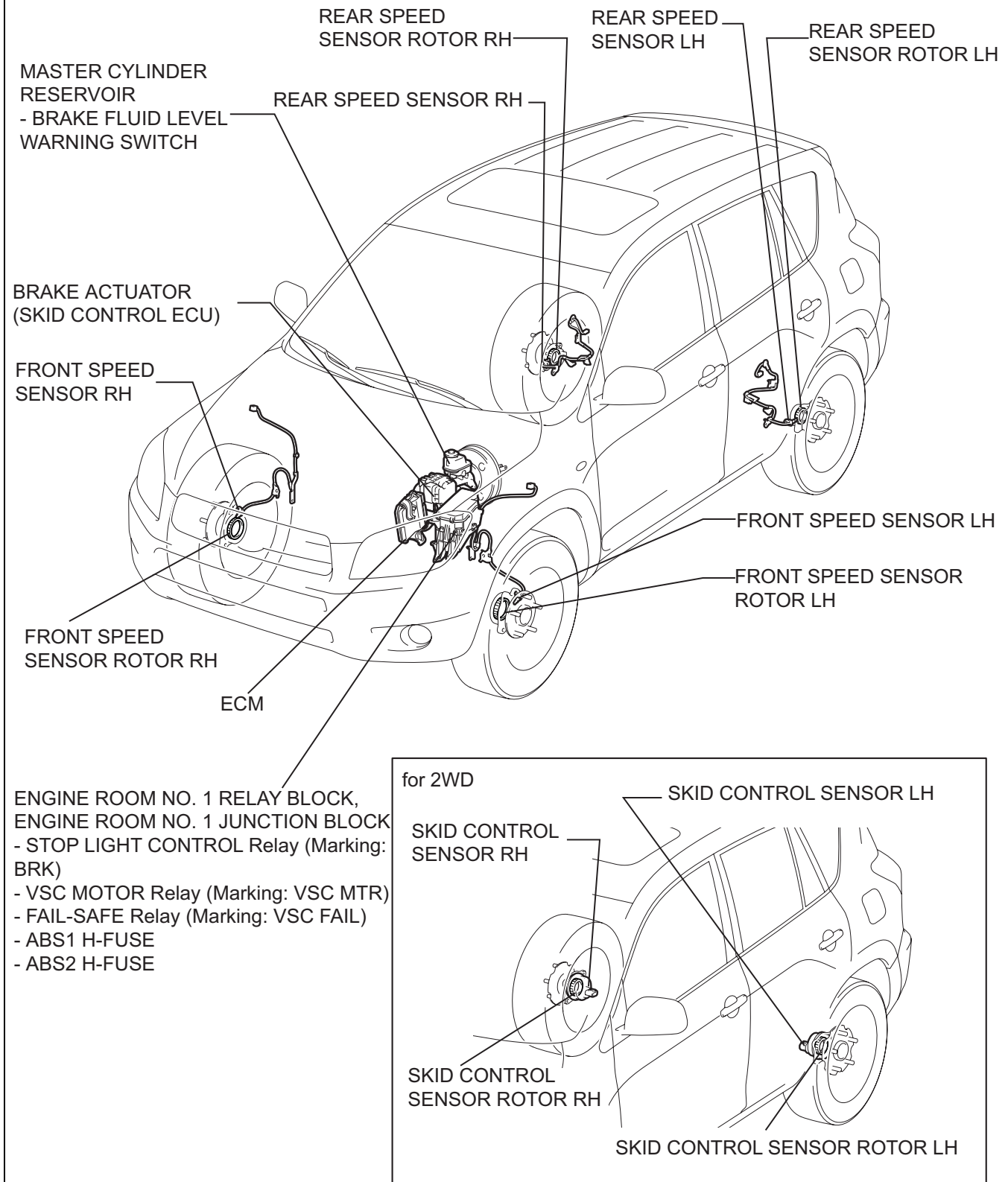
VEHICLE STABILITY CONTROL SYSTEM

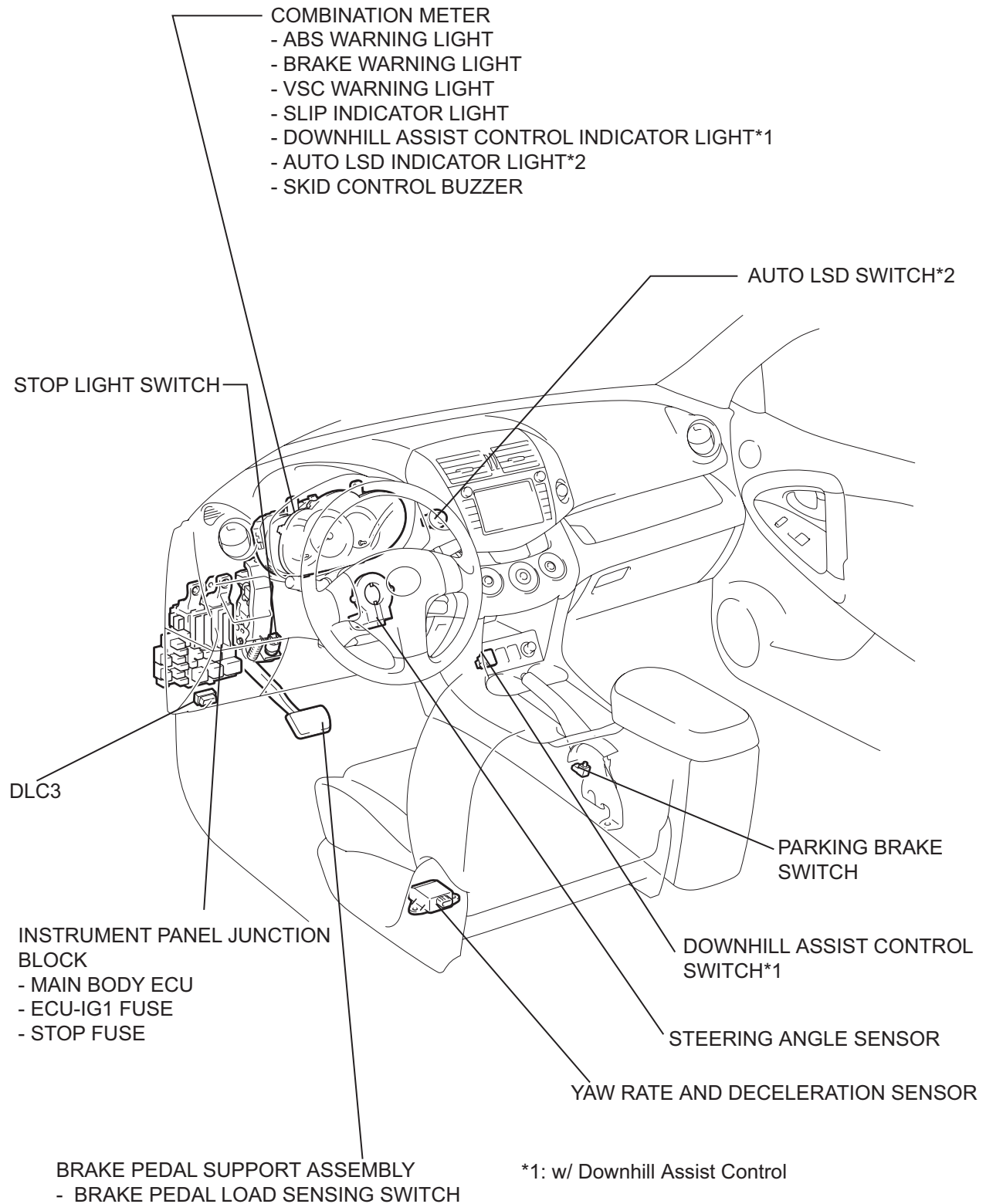
PRECAUTION

1. TROUBLESHOOTING PRECAUTION

- When there are malfunctions in the contact points of the terminals or installation problems with any parts, removal and installation of the suspected problem parts may return the system to its normal condition either entirely or temporarily.
- In order to determine the location of the malfunction, be sure to check the conditions at the time the malfunction occurred through data such as DTC and freeze frame data outputs. Record this information before disconnecting any connectors and removing or installing any parts.
- Since the vehicle stability control system may be influenced by malfunctions in other systems, be sure to check for DTCs in other systems.
- Be sure to remove and install the ABS and TRACTION actuator and each sensor with the ignition switch OFF, unless specified in the inspection procedures.
- When removing and installing the ABS and TRACTION actuator and each sensor, be sure to check that the normal display is output during a test mode inspection and a DTC output inspection after reinstalling all the parts.
- After replacing the ABS and TRACTION actuator and/or yaw rate sensor, be sure to perform yaw rate and deceleration sensor zero point calibration (see page [BC-24](#)).
- The CAN communication system is used for data communication between the skid control ECU, the steering sensor and the yaw rate sensor (the deceleration sensor is included). If there is trouble in the CAN communication line, the DTC of the communication line is output.
- If the DTC of the CAN communication line is output, repair the malfunction in the communication line and then troubleshoot the vehicle stability control system.
- Since the CAN communication line has its own length and route, it cannot be repaired temporarily with a bypass wire, etc.

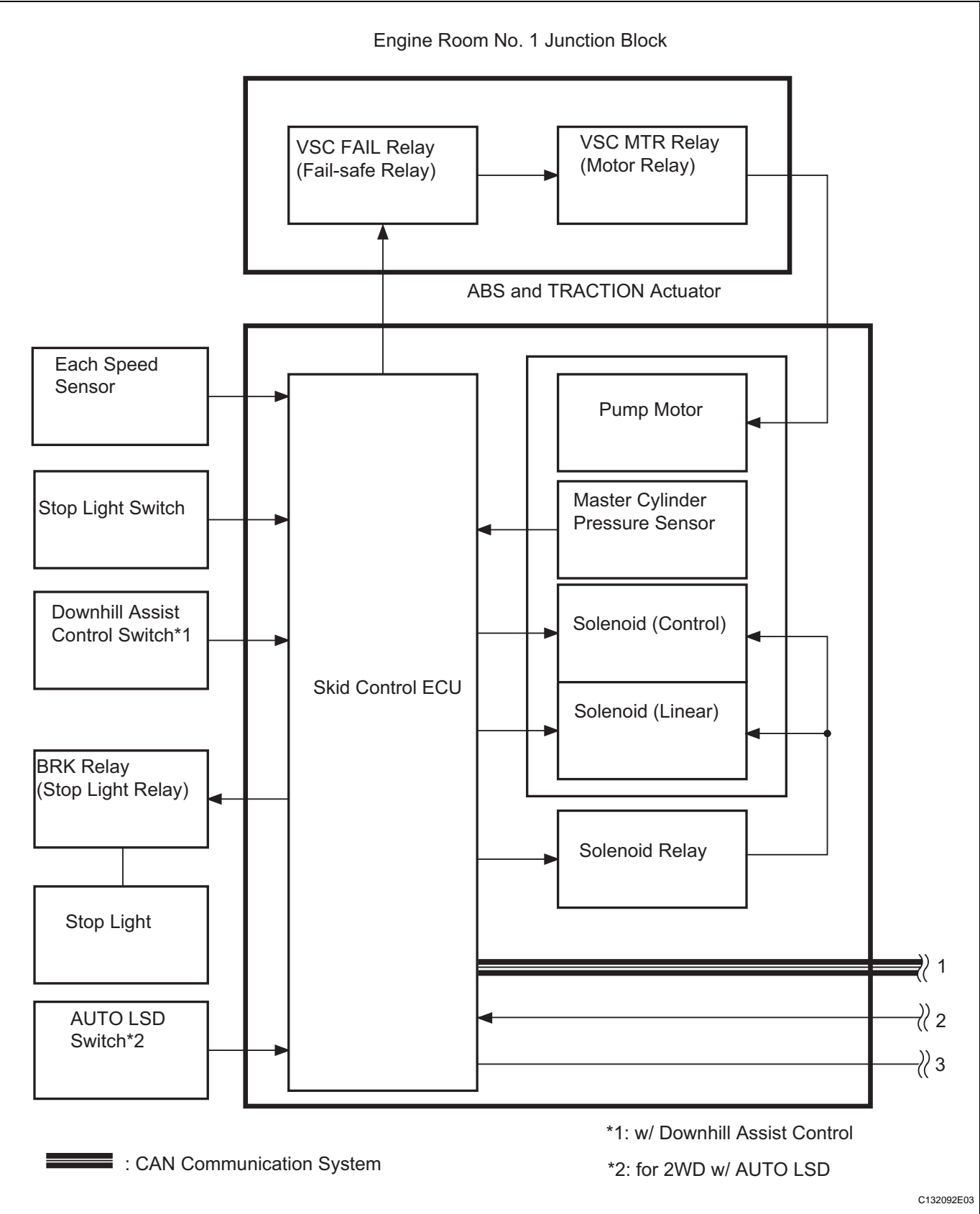
PARTS LOCATION

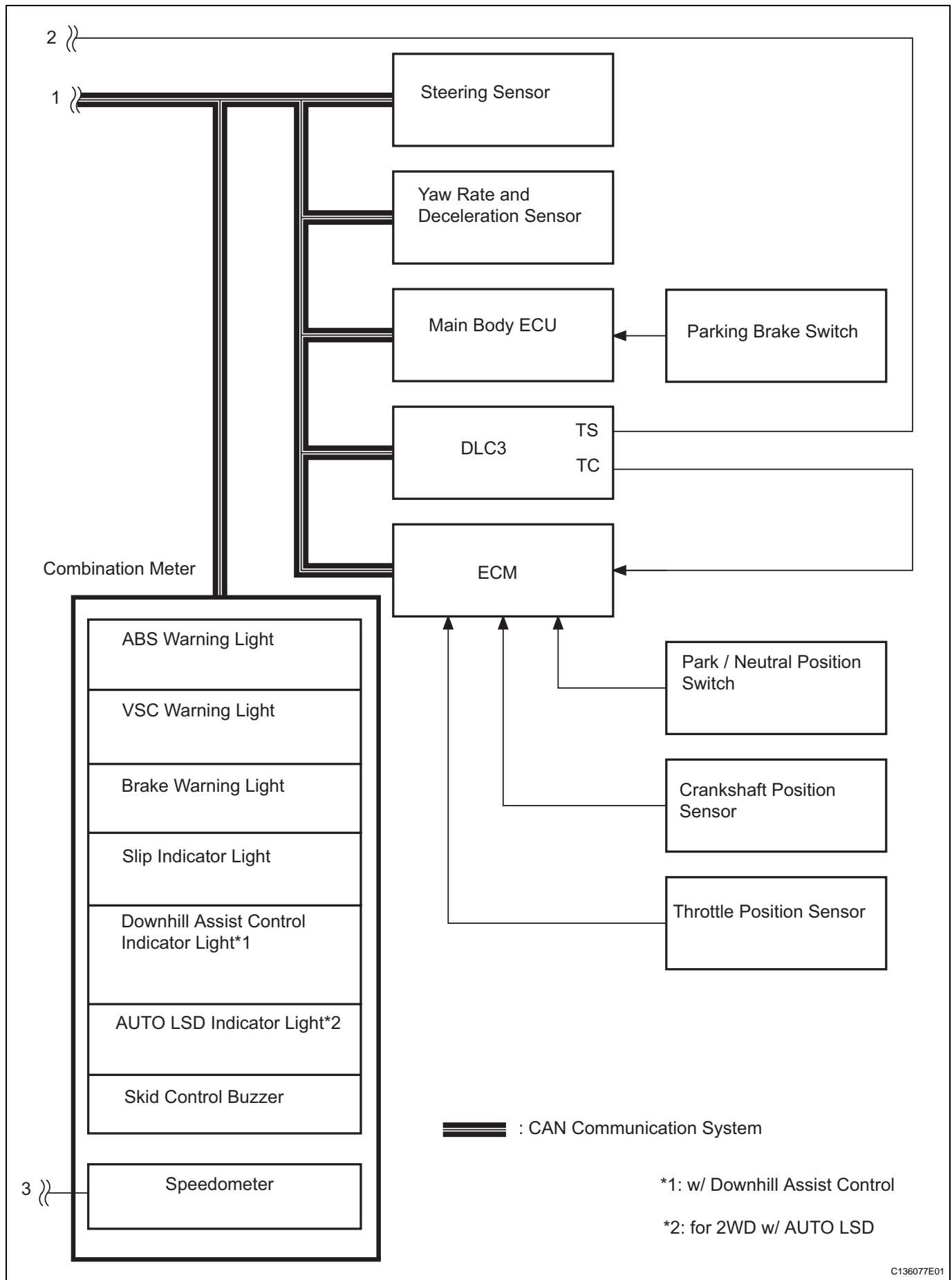




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SYSTEM DIAGRAM





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SYSTEM DESCRIPTION

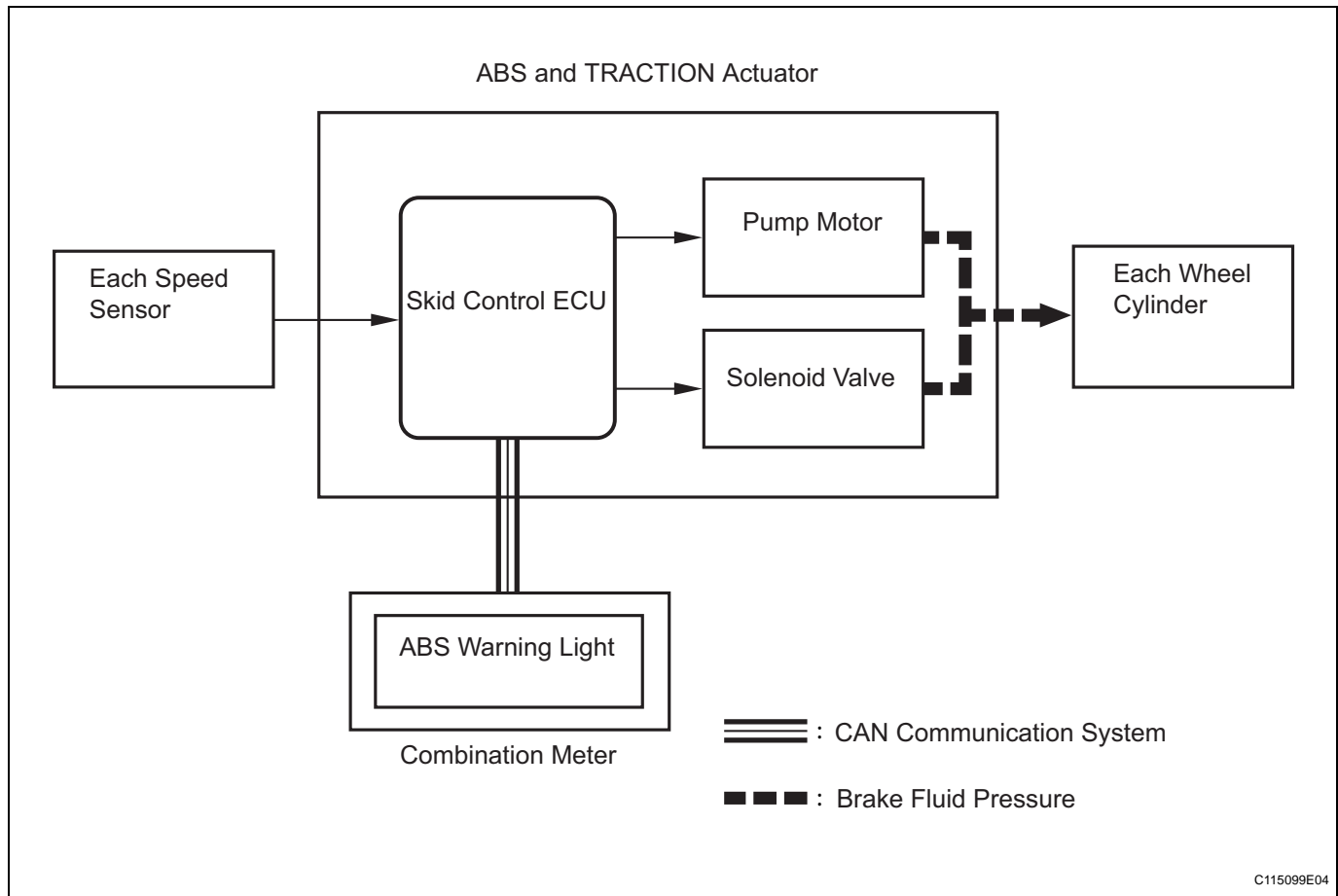
1. SYSTEM DESCRIPTION

HINT:

The skid control ECU forms a single unit with the ABS and TRACTION actuator.

(a) ABS (Anti-lock Brake System):

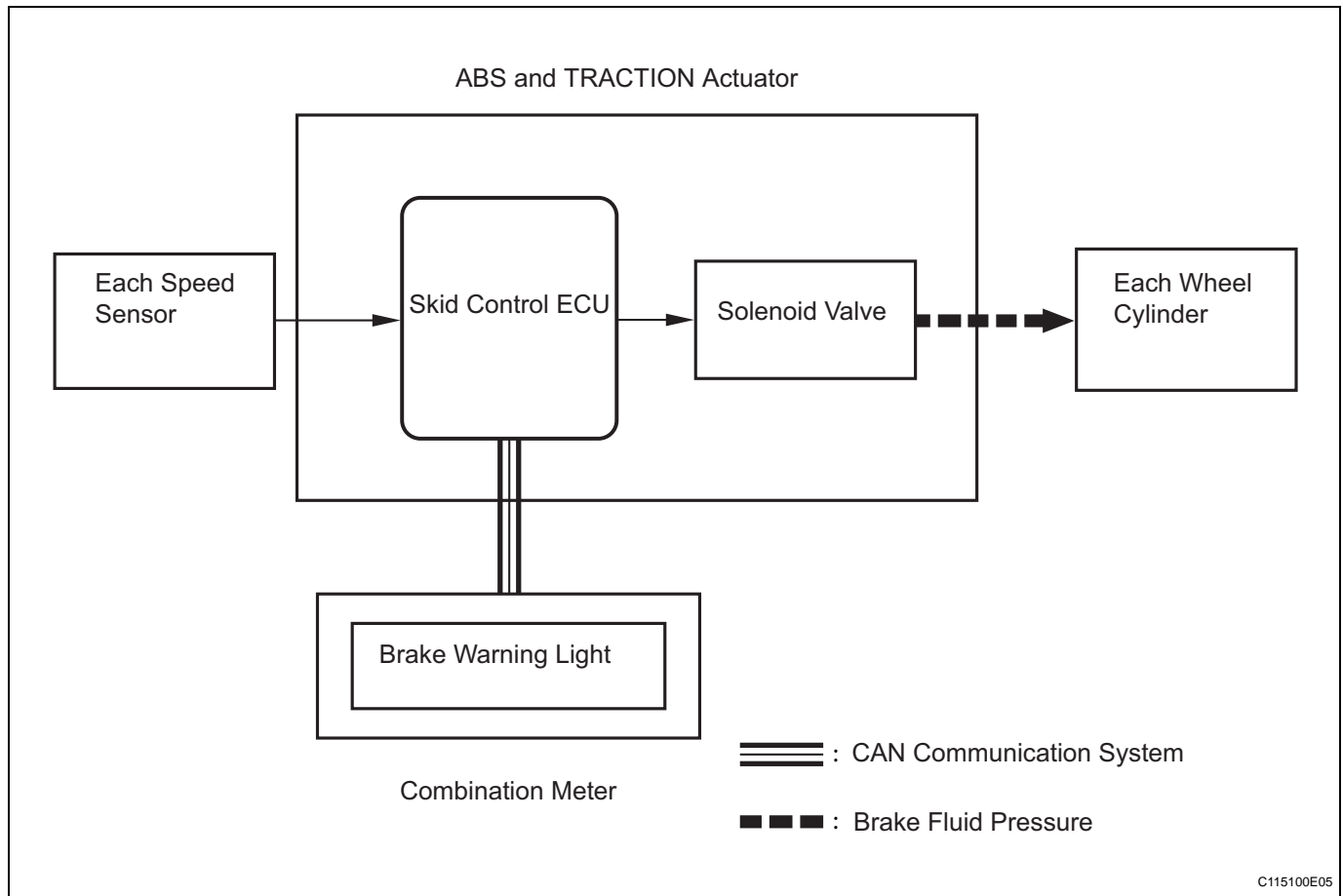
The ABS helps prevent the wheels from locking when the brakes are applied firmly or on a slippery surface.



(1) Operation description:

The skid control ECU detects wheel lock conditions by receiving vehicle speed signals from each speed sensor, and sends control signals to the pump motor and solenoid valve to prevent wheels from locking by controlling the brake fluid pressure of each wheel cylinder. The ABS warning light comes on when the ABS system malfunctions.

- (b) EBD (Electronic Brake Force Distribution):
The EBD control utilizes the ABS to create the proper brake force distribution between the front and rear wheels in accordance with the driving conditions and vehicle load. In addition, when the brakes are applied while cornering, it also controls the braking forces of the right and left wheels, helping to maintain vehicle stability.



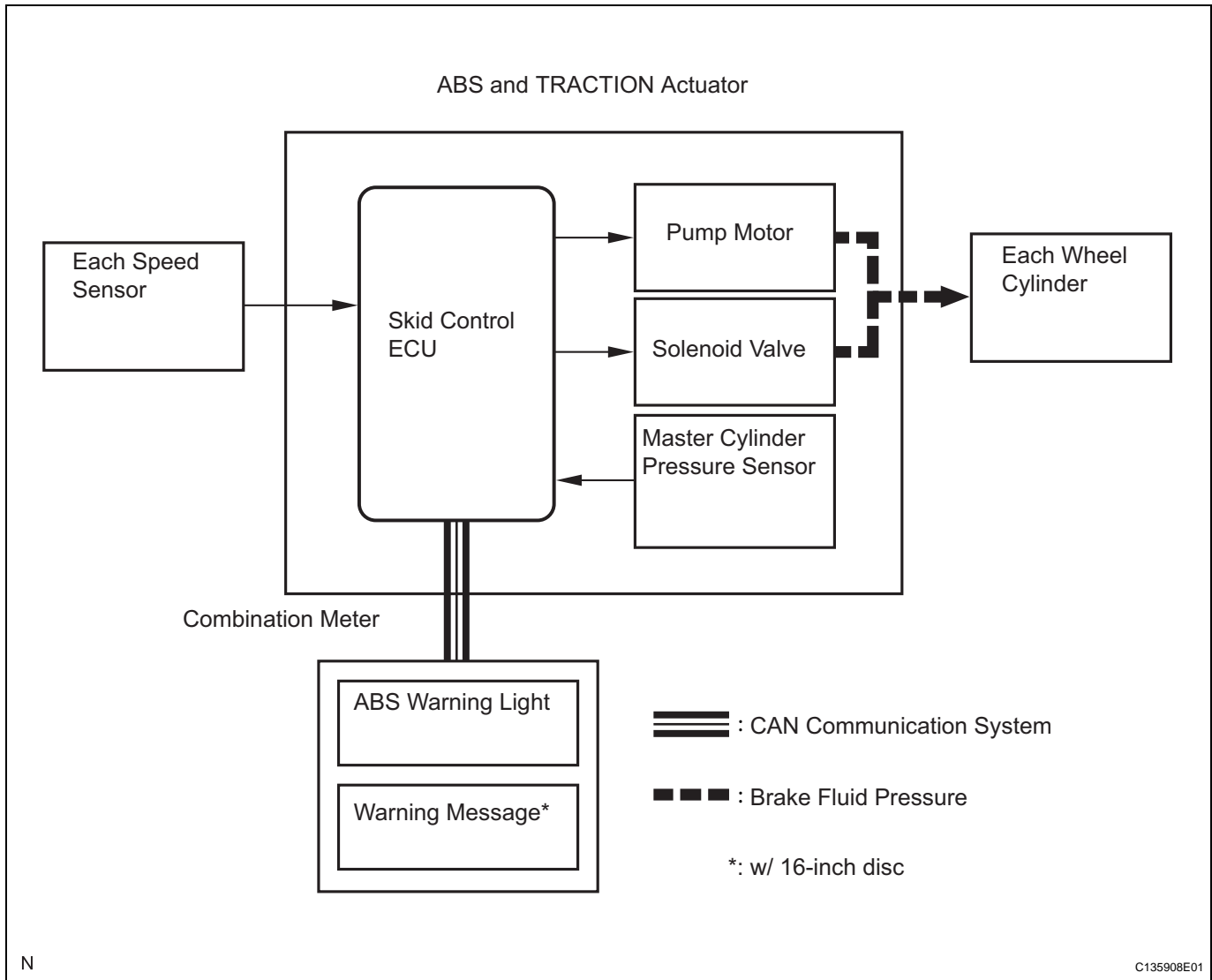
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- (1) Operation description:
The skid control ECU receives speed signals from each speed sensor to detect the slip conditions of the wheels and sends control signals to the solenoid. The solenoid valve controls the brake fluid pressure of each wheel cylinder and divides the control power properly between the front and rear wheels and the right and left wheels. The brake warning light comes on to indicate malfunctions in the EBD system.

(c) BA (Brake Assist):

The primary purpose of the brake assist system is to provide auxiliary brake force to assist drivers who cannot generate a large enough brake force during emergency braking, thus helping to maximize the vehicle's braking performance.

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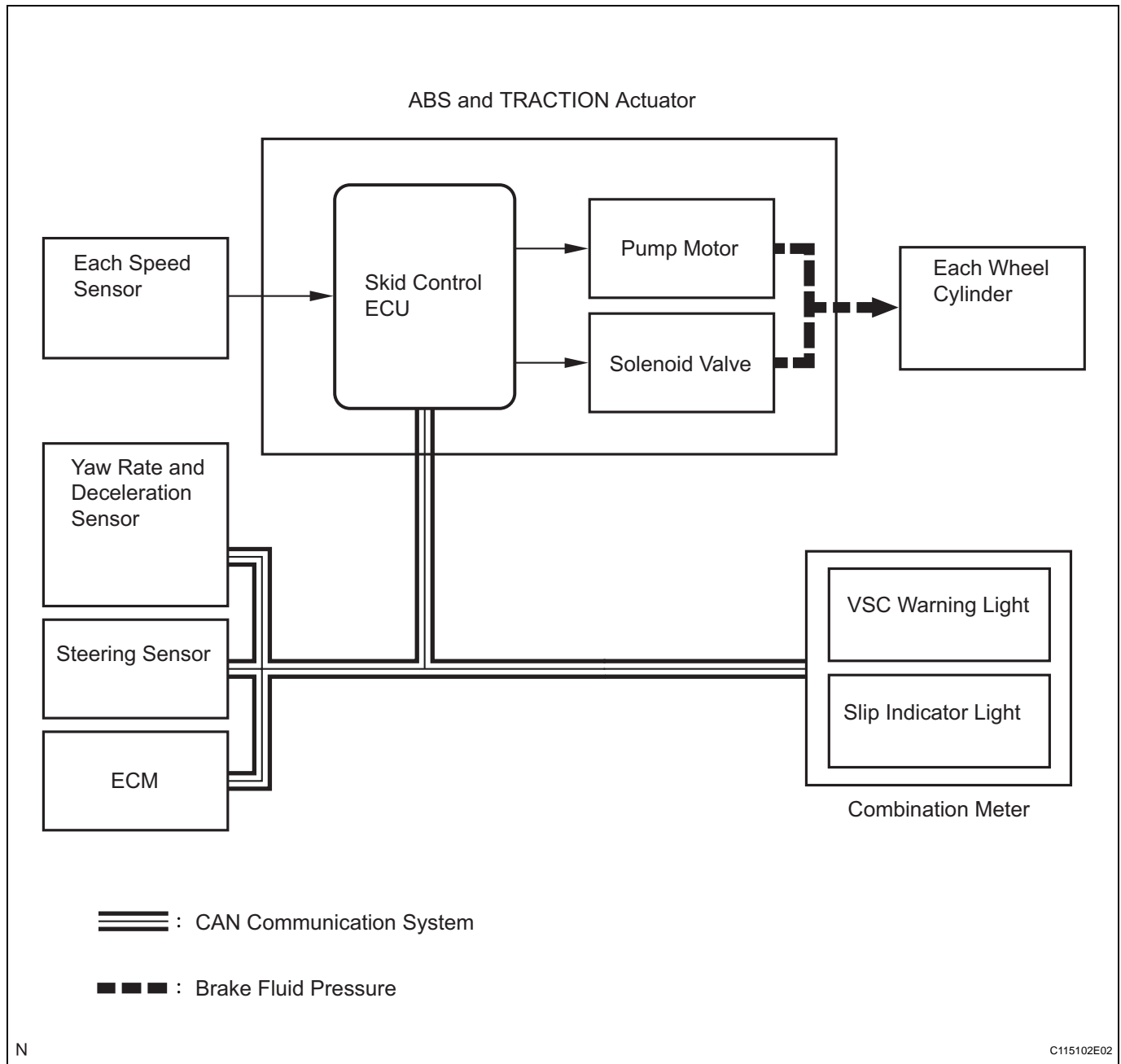


(1) Operation description:

The skid control ECU receives speed signals from each speed sensor and the fluid pressure signal from the master cylinder pressure sensor to determine whether brake assist is necessary. If brake assist is deemed necessary, the skid control ECU sends control signals to the pump motor and solenoid. The pump and the solenoid valve then control the pressure applied to each wheel cylinder. The ABS warning light comes on to indicate malfunctions in the BA (brake assist) system.

w/ 16-inch disc: The brake warning light and ABS warning light come on to indicate malfunctions in the BA system.

- (d) TRC (Traction Control):
The TRC system helps prevent the drive wheels from slipping if the driver presses down on the accelerator pedal excessively when starting off or accelerating on a slippery surface.



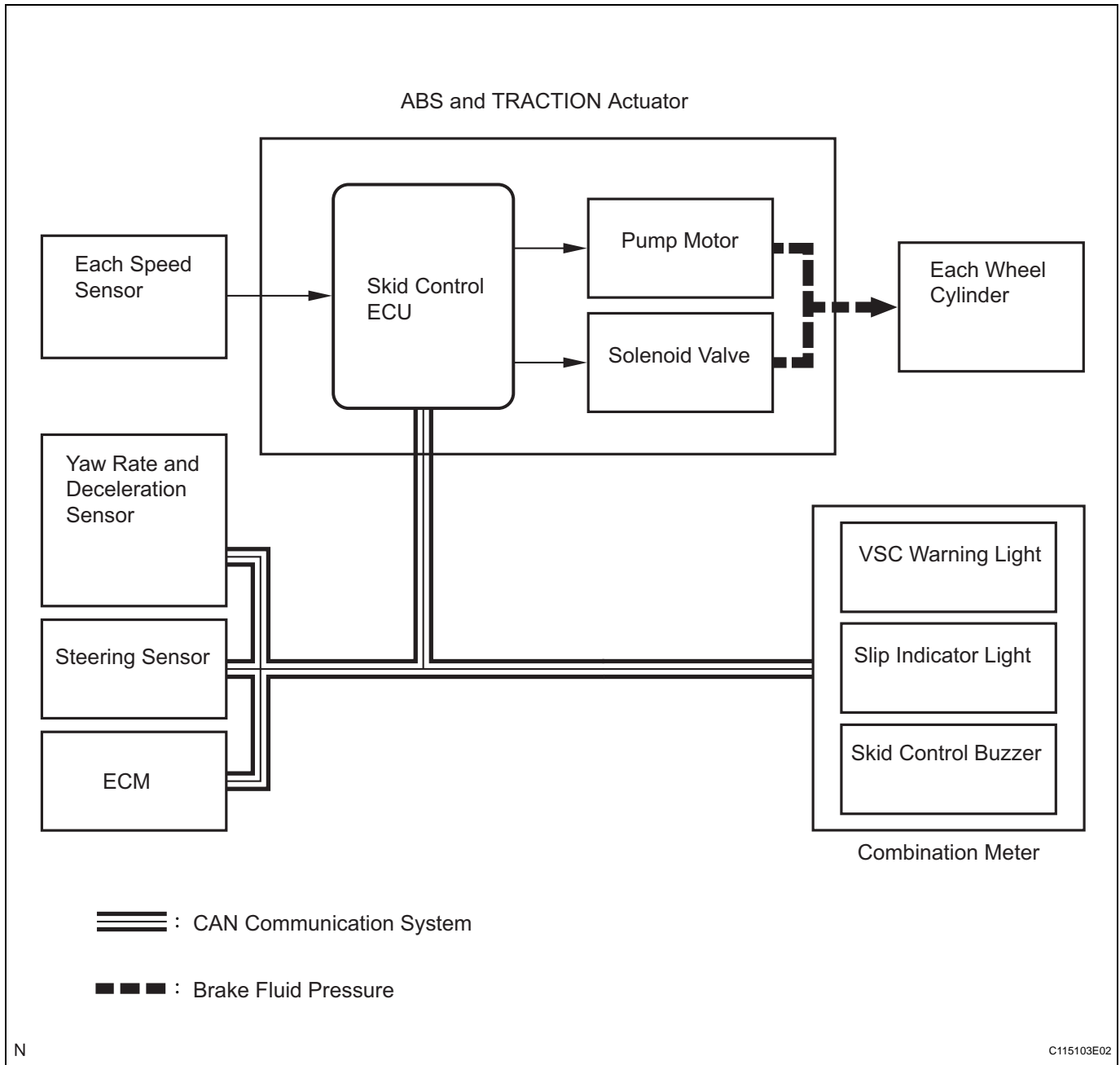
(1) Operation description:

The skid control ECU detects the vehicle's slip condition by receiving signals from each speed sensor and the ECM via CAN communication. The skid control ECU controls engine torque with the ECM via CAN communication and brake fluid pressure through the pump and solenoid valve. The slip indicator light blinks when the system is operating.

for 4WD: The VSC warning light comes on when the TRC system malfunctions.

for 2WD: The VSC warning light and SLIP indicator light comes on when the TRC system malfunctions.

- (e) VSC (Vehicle Stability Control):
The VSC system helps prevent the vehicle from slipping sideways when front or rear wheel skidding occurs while cornering.



(1) Operation description:

The skid control ECU determines the vehicle condition by receiving signals from the speed sensor, the yaw rate and deceleration sensor and the steering sensor. The skid control ECU controls engine torque with the ECM via CAN communication and brake fluid pressure through the pump and solenoid valve. The slip indicator light blinks and the skid control buzzer sounds when the system is operating.

for 4WD: The VSC warning light comes on when the TRC system malfunctions.

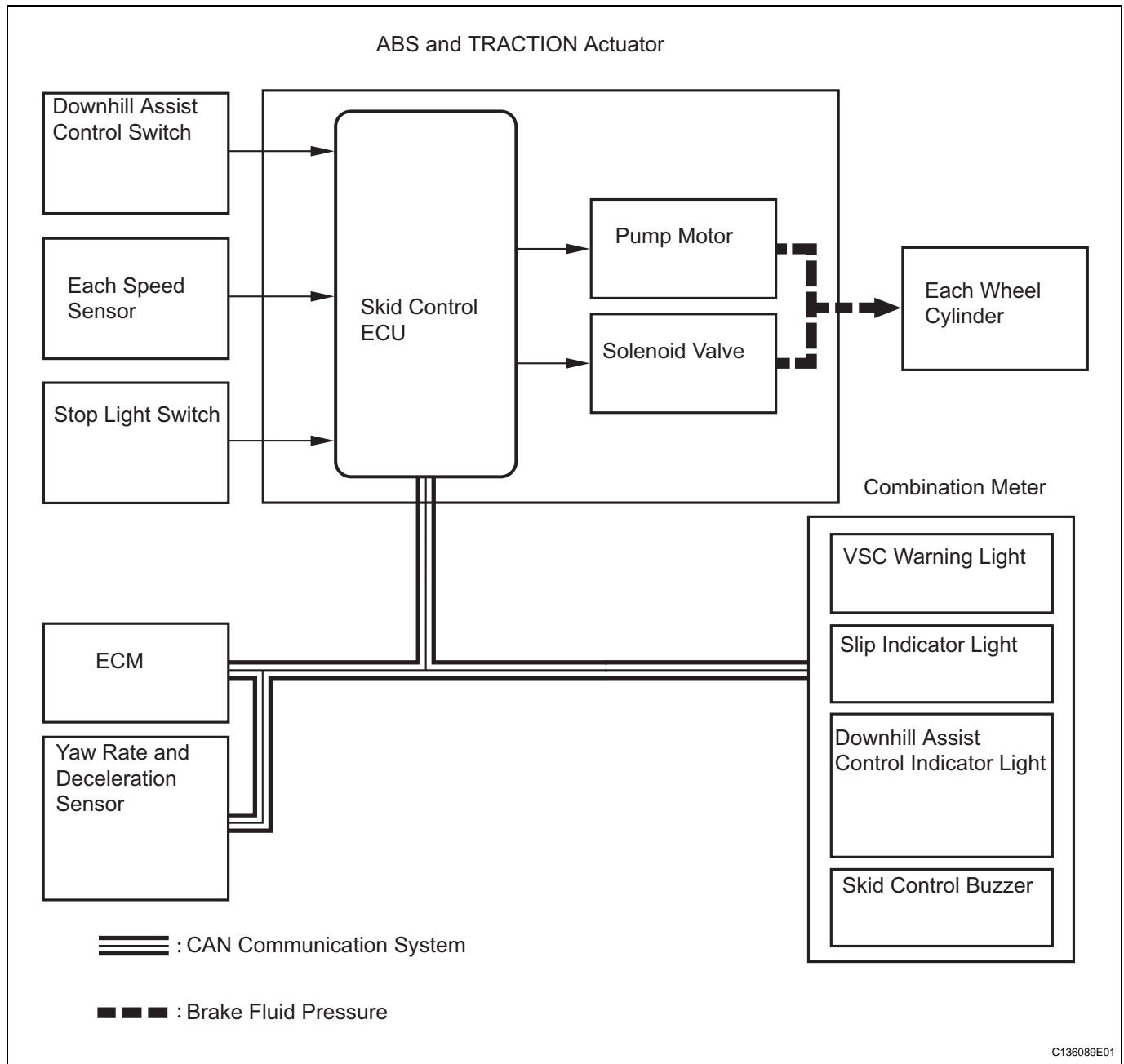
for 2WD: The VSC warning light and slip indicator light come on when the TRC system malfunctions.

(f) Downhill Assist Control:

When the downhill assist control switch is pressed with the shift lever on L or R range and the accelerator and brake pedals not depressed, downhill assist control is activated. When activated, 4-wheel hydraulic pressure control occurs in order to maintain a constant low vehicle speed without causing the wheels to become locked. Thus, the vehicle can descend a steep hill in a stable manner.

HINT:

- Depressing the accelerator and brake pedal cancels control of the downhill assist control.
- Downhill assist control begins operating when driving down on a slope at a speed of 25 km/h (16 mph) or less with the engine brake applied.



BC

(1) Operation description:

The slip indicator light blinks and the downhill assist control indicator light and brake light come on when the system is in operation.

The VSC warning light comes on and the downhill assist control indicator light blinks to indicate a malfunction in the downhill assist control.

(g) Hill-start assist control:

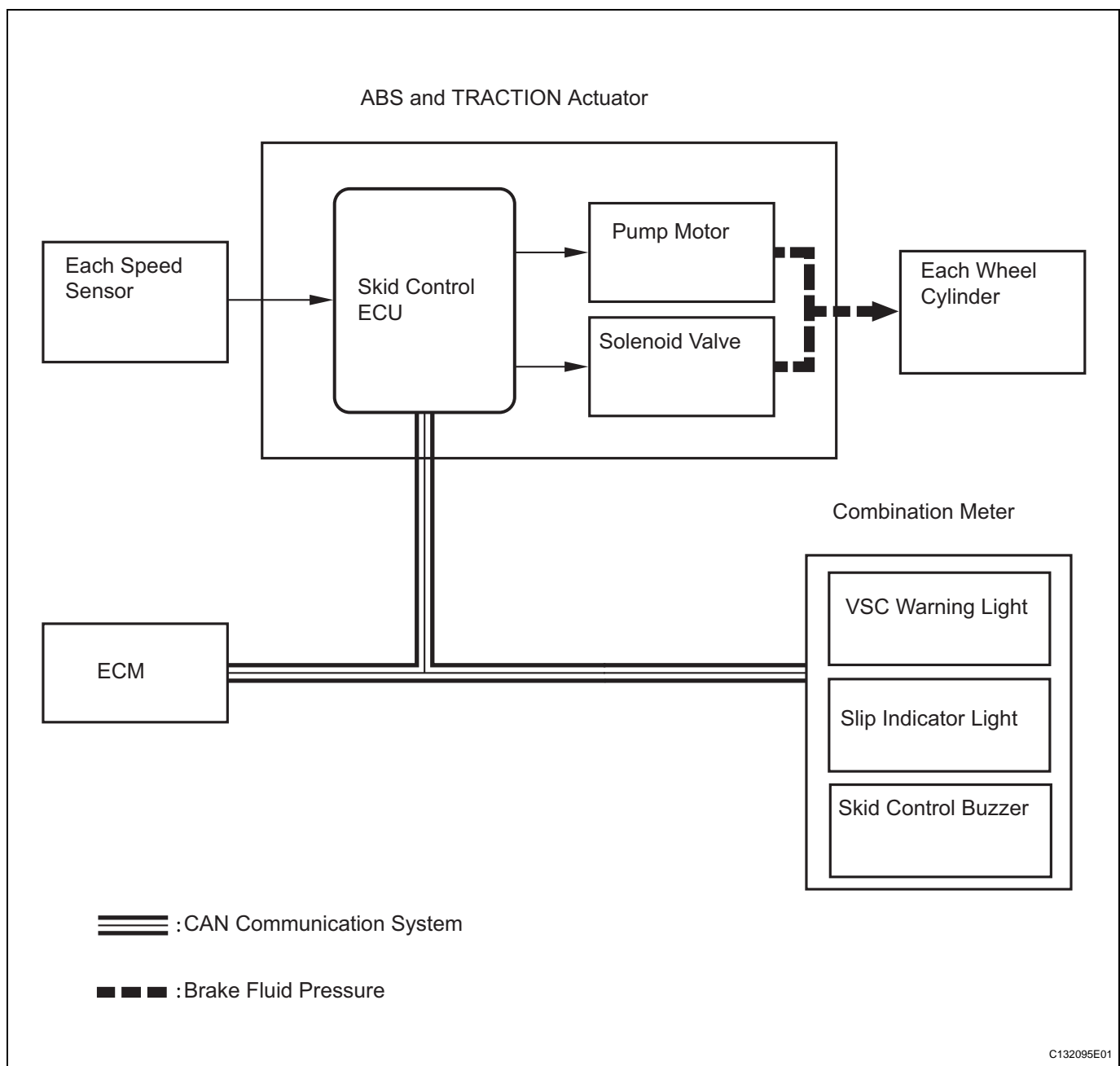
When the vehicle starts off on a steep hill, hill-start assist control effects 4-wheel hydraulic pressure control to prevent the vehicle from rolling backwards.

After a maximum of 2 seconds after the control has started, fluid pressure is gradually released and control will be complete.

HINT:

- Depressing the brake pedal cancels control of the hill-start assist control.
- Hill-start assist control does not operate when the shift lever is in the P position, or when the vehicle is running, the parking brake lever is set, or the accelerator pedal is depressed.

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(1) Operation description:

When the system is in operation, the following occurs: 1) the slip indicator light blinks; 2) the VSC light comes on; and 3) when hill-start assist control operation starts, the skid control buzzer sounds once; when hill-start assist control operation ends, the skid control buzzer sounds twice.

The VSC warning light comes on when the hill-start assist control is malfunctioning.

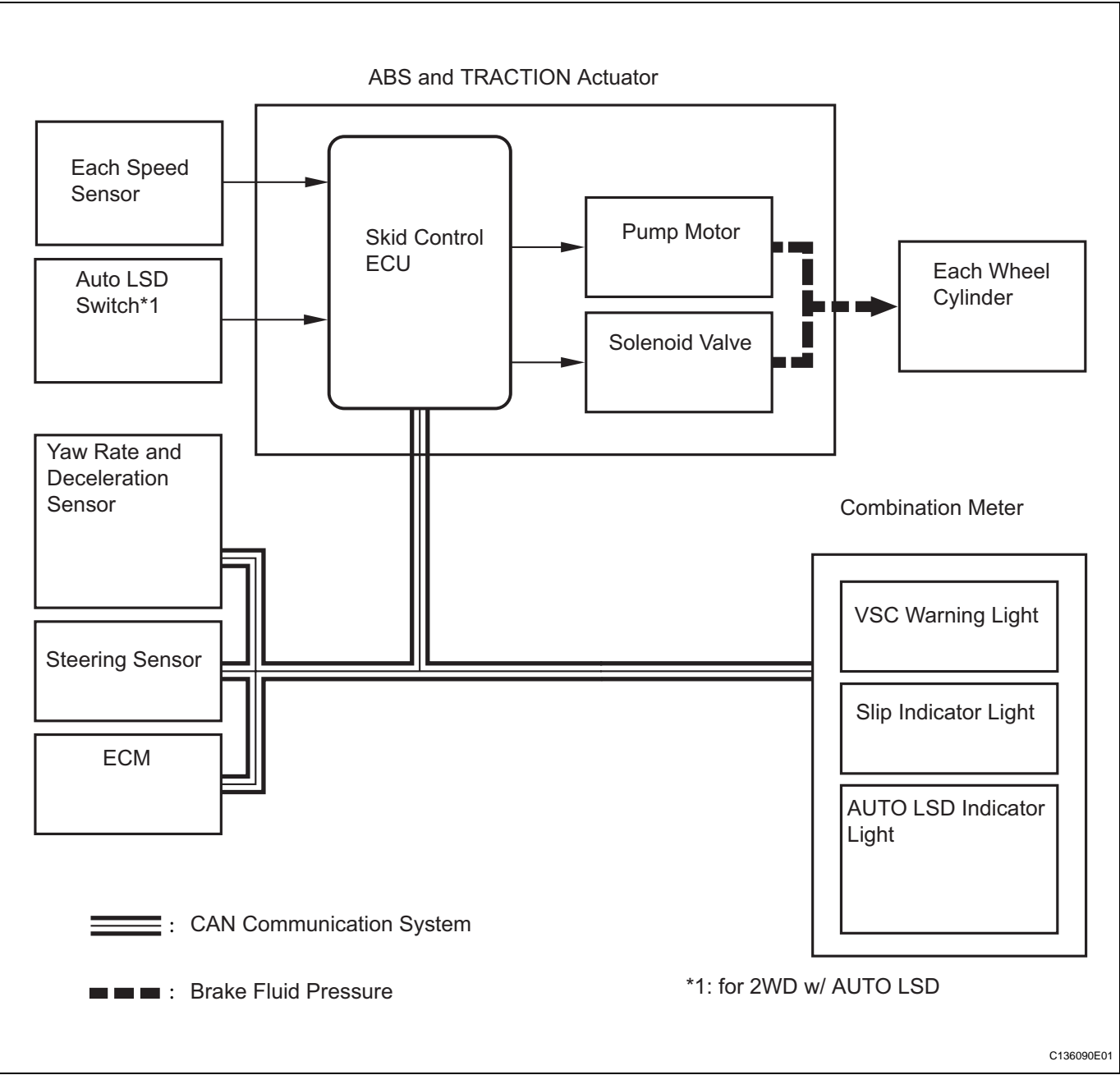
- (h) AUTO LSD (Auto Limited Slip Differential) for 2WD: The AUTO LSD achieves the equivalent functions of an LSD (Limited Slip Differential) through the use of a traction control system. When the driver presses the AUTO LSD switch, this system achieves the LSD effect by regulating the hydraulic pressure that acts on the drive wheels and controlling the engine output in accordance with the amount of pedal effort applied on the accelerator. The AUTO LSD operates with the AUTO LSD switch on and the accelerator pedal depressed.

Auto LSD restrains brake pressure and reduces differential movement, thus transmitting the drive torque to the other drive wheel to ensure stability under the following conditions:

- Wheels run off the road.
- Drive wheels spin in place when starting on a slope with one wheel on snow/ice.

HINT:

Releasing the accelerator pedal cancels control of the AUTO LSD system.



(1) Operation description:

The skid control ECU determines that the vehicle is in a state in which the AUTO LSD can operate by using various sensors and switches to detect the operating conditions of the AUTO LSD switch, shift position, accelerator pedal, and brake pedal. When the vehicle is in a state in which the AUTO LSD can operate, the skid control ECU effects hydraulic pressure control of the wheel cylinder at the wheel with the faster wheel speed so that the wheel speeds of the right and left drive wheels will become equal. The slip indicator light blinks and the AUTO LSD indicator light comes on when the system is operating. Both the VSC warning light and SLIP indicator light come on when the AUTO LSD system malfunctions.

2. COOPERATIVE CONTROL FUNCTION

(a) Description

(1) Braking when Surface Resistance Differs Between Left and Right Wheels

If the driver suddenly applies the brakes on a road surface with a considerable difference in friction coefficient between the right and left wheels, the difference in the brake force between the right and left wheels will cause the vehicle posture to become unstable and create a yaw movement. In this state, the skid control ECU controls the VSC to stabilize the vehicle posture. At the same time, it effects cooperative control with the EPS to provide steering torque assist, which facilitates the driver's steering maneuvers to stabilize the vehicle posture.

(2) Accelerating when Surface Resistance Differs Between Left and Right Wheels

If the driver suddenly starts off or accelerates on a road surface with a considerable difference in friction coefficient between the right and left wheels, the slippage of a drive wheel will cause the vehicle posture to become unstable and negatively affect its acceleration performance. In this state, the skid control ECU causes the TRC to control the hydraulic brake of the slipping drive wheel, and requests the engine ECU to effect engine output control. At the same time, it effects cooperative control with the EPS to provide steering torque assist, which facilitates the driver's steering maneuvers to stabilize the vehicle posture.

(3) Front Wheel Skid Tendency

When the skid control ECU determines that there is a front wheel skid tendency, it controls the VSC to dampen the front wheel skid. At the same time, it effects cooperative control with the EPS to provide steering torque assist, which facilitates the driver's steering maneuvers to stabilize the vehicle posture. To prevent excessive steering maneuvers, it provides a steering torque assist. This assist increases the resistance to counter the driver's steering effort, if the driver turns the steering wheel excessively.

(4) Rear Wheel Skid Tendency

When the skid control ECU determines that there is a rear wheel skid tendency, it controls the VSC to dampen the rear wheel skid. At the same time, it effects cooperative control with the EPS to provide steering torque assist, which facilitates the driver's steering maneuvers in the direction to correct the rear wheel skid.

(5) Acceleration During Cornering

A sudden acceleration of the vehicle during cornering may cause a drive wheel to freewheel, which could cause the front wheels or rear wheels to skid. If the skid control ECU determines that there is freewheeling of a drive wheel, a front wheel skid tendency, or a rear wheel skid tendency, it effects cooperative control with the 4WD system to optimally control the drive torque distribution to the front and rear wheels. Furthermore, it controls the TRC and the VSC as needed to ensure driving stability and acceleration performance.

(b) Operation

The operation of the solenoid valves under the cooperative control is the same as the TRC or VSC operation.

3. ABS WITH EBD, BA, TRC AND VSC OPERATION

(a) The skid control ECU calculates vehicle stability tendency based on the signals from the 4 wheel speed sensors, the yaw rate and deceleration sensor and the steering sensor. In addition, it evaluates the results of the calculations to determine whether any control actions (control of the engine output torque by electronic throttle control and of the brake fluid pressure by the ABS and TRACTION actuator) should be implemented.

(b) The slip indicator blinks and the skid control buzzer sounds to inform the driver that the VSC system is operating. The slip indicator also blinks when traction control is operating, and the operation being performed is displayed.

4. FAIL SAFE FUNCTION

- (a) When a failure occurs in the ABS with BA, TRC and VSC systems, the ABS and VSC warning lights illuminate, the slip indicator light comes on*1 or remains off*2, and the operations of those systems are prohibited. In addition to this, when a failure which disables the EBD operation occurs, the brake warning light comes on and its operation is prohibited.

HINT:

*1: for 2WD

*2: for 4WD

- (b) If control is prohibited due to a malfunction during operation, control is disabled gradually to avoid sudden vehicle instability.

5. INITIAL CHECK

- (a) When the vehicle speed first reaches approximately 6 km/h (4 mph) or more after the ignition switch is turned ON, each solenoid valve and the motor of the ABS and TRACTION actuator are sequentially activated to perform electrical checks. During the initial check, the operating sound of the solenoid valve and motor can be heard from the engine compartment, but this does not indicate a malfunction.

6. SERVICE MODE

- (a) VSC operation can be disabled by operating the intelligent tester.

HINT:

Refer to the intelligent tester operator's manual for further details.

7. FUNCTION OF COMPONENTS

Components	Functions
Speed Sensor (Semiconductor Type)	Detects the wheel speed and sends the signal to skid control ECU
Skid Control ECU (Housed in ABS and TRACTION Actuator)	<ul style="list-style-type: none"> Processes the signals from each sensor to control the ABS, BA, TRC, and VSC Sends and receives control signals to and from the ECM, yaw rate and deceleration sensor, steering sensor, etc. via CAN communication.
ABS and TRACTION Actuator	<ul style="list-style-type: none"> Consists of the master cylinder cut solenoid valve, holding solenoid valve, pressure reduction solenoid valve, pump motor, and reservoir, and adjusts the brake fluid pressure applied to each wheel cylinder Houses the skid control ECU
Solenoid Relay	<ul style="list-style-type: none"> Supplies power to each solenoid Housed in the skid control ECU
Motor Relay (VSC MTR Relay)	<ul style="list-style-type: none"> Supplies power to the pump motor Installed in engine room No. 1 relay block
Fail-safe Relay (VSC FAIL Relay)	<ul style="list-style-type: none"> Cuts off power to the motor when the pump motor circuit malfunctions Installed in engine room No. 1 relay block

Components		Functions
Steering Sensor		<ul style="list-style-type: none"> • Detects the steering extent and direction and sends signals to the skid control ECU via CAN communication • Has a magnetic resistance element which detects the rotation of the magnet housed in the detection gear in order to detect the changes in magnetic resistance and the steering amount and direction
Yaw Rate and Deceleration Sensor		<ul style="list-style-type: none"> • Yaw rate sensor detects the vehicle's angular velocity (yaw rate) in the vertical direction based on the extent and direction of the deflection of the piezoelectric ceramics • Deceleration sensor measures the capacity of the condenser that changes the distance between the electrodes depending on G force, which occurs when the vehicle is accelerated, and converts the measured value into electrical signals • Sends signals to the skid control ECU via CAN communication
Master Cylinder Pressure Sensor		<ul style="list-style-type: none"> • Detects the brake fluid pressure in the master cylinder • Housed in the ABS and TRACTION actuator
ECM		<ul style="list-style-type: none"> • Controls the engine output when TRC and VSC are operating with the skid control ECU via CAN communication
Downhill Assist Control switch*1		Allows the driver to turn downhill assist control ON and OFF
AUTO LSD switch*2		Allows the driver to turn AUTO LSD ON and OFF
Combination Meter	ABS Warning Light	<ul style="list-style-type: none"> • Illuminates to inform the driver that a malfunction in the ABS has occurred • Blinks to indicate DTCs that relate to the ABS
	VSC Warning Light	<ul style="list-style-type: none"> • Illuminates to inform the driver that a malfunction in the VSC system has occurred • Blinks to indicate DTCs that relate to the VSC
	Brake Warning light	<ul style="list-style-type: none"> • Illuminates to inform the driver that the parking brake is ON when the system is normal, and when the brake fluid has decreased • Illuminates to inform the driver that a malfunction in the EBD has occurred
	Slip Indicator Light	<ul style="list-style-type: none"> • Blinks to inform the driver that TRC, VSC, downhill assist control and hill-start assist control are operating • Illuminates to inform the driver that a malfunction has occurred in the TRC or VSC system
	AUTO LSD Indicator Light*2	Lights up to inform the driver when AUTO LSD operation is possible
	Downhill Assist Control Indicator Light*1	Lights up to inform the driver when downhill assist control operation is possible
	Skid Control Buzzer	<ul style="list-style-type: none"> • Intermittently sounds to inform the driver that the VSC is operating • Housed in the combination meter

HINT:

*1: w/ Downhill assist control

*2: for 2WD w/ AUTO LSD

HOW TO PROCEED WITH TROUBLESHOOTING

HINT:

- Use these procedures to troubleshoot the vehicle stability control system.
- *: Use the intelligent tester.

1 VEHICLE BROUGHT TO WORKSHOP**NEXT****2 INSPECT BATTERY VOLTAGE****Standard voltage:****11 to 14 V**

If the voltage is below 11 V, recharge or replace the battery before proceeding.

NEXT**3 CHECK AND CLEAR DTC*****NEXT****4 PROBLEM SYMPTOM CONFIRMATION****Result**

Result	Proceed to
Symptom does not occur	A
Symptom occurs	B

B**Go to step 7****A****5 SYMPTOM SIMULATION****NEXT****6 CHECK COMMUNICATION FUNCTION OF CONTROLLER AREA NETWORK (CAN)***

- (a) Use the intelligent tester to check for normal functioning of the CAN communication system.
- (1) Perform bus check (communication malfunction DTC).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**Go to CAN COMMUNICATION SYSTEM****A****7****CHECK FOR DTC*****Result**

Result	Proceed to
DTC is not output	A
DTC is output	B

B**Go to step 10****A****BC****8****PROBLEM SYMPTOMS TABLE****Result**

Result	Proceed to
Fault is not listed in problem symptoms table	A
Fault is listed in problem symptoms table	B

B**Go to step 10****A****9****OVERALL ANALYSIS AND TROUBLESHOOTING**

- (a) Terminals of ECU (see page [BC-41](#))
 (b) Data List / Active Test (see page [BC-52](#))

NEXT**Go to step 11****10****CHECK FOR FLUID LEAKAGE****NEXT**

11	REPAIR OR REPLACE
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NEXT

12	CONFIRMATION TEST
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NEXT

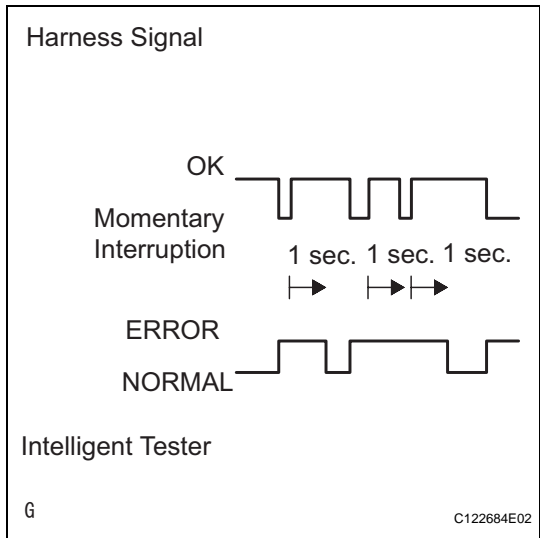
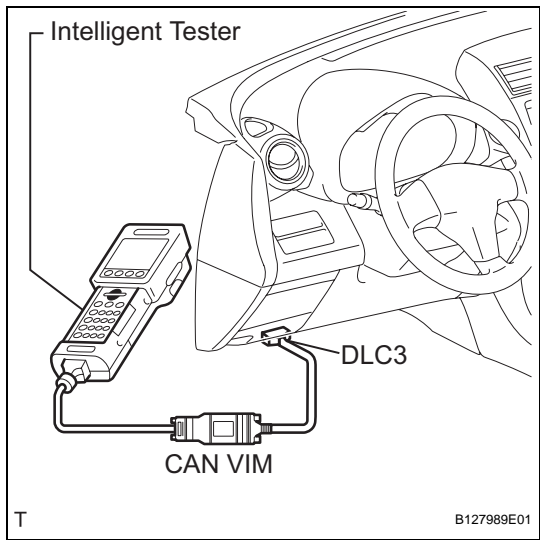
END

CHECK FOR INTERMITTENT PROBLEMS

1. CHECK FOR INTERMITTENT PROBLEMS

HINT:
A momentary interruption (open circuit) in the connectors and/or wire harness between the sensors and ECUs can be detected by using the ECU DATA LIST function of an intelligent tester.

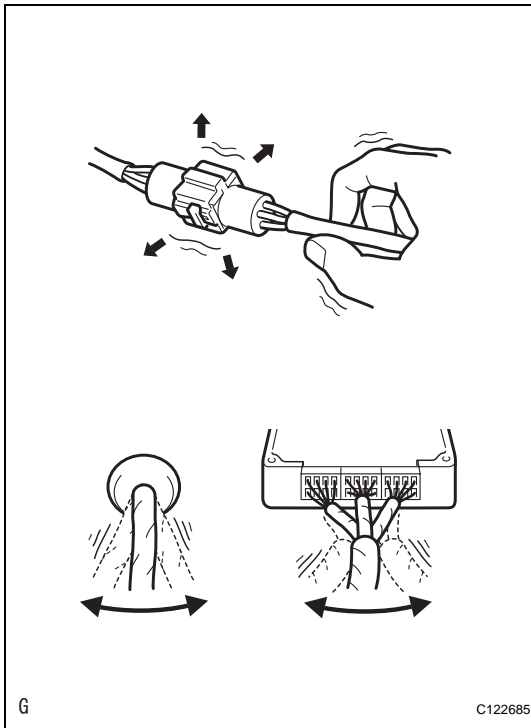
- (a) Turn the ignition switch OFF and connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON.



- (c) Follow the prompts on the intelligent tester to display the DATA LIST and select areas where a momentary interruption should be monitored.
HINT:
 - A momentary interruption (open circuit) cannot be detected for 3 seconds after the ignition switch is turned ON (initial check).
 - If the status remains on the ERROR display, check for continuity between the ECU and the sensors, or between ECUs.
 - The ERROR display on the intelligent tester remains on for 1 second after the harness signal changes from a momentary interruption (open circuit) to normal condition.

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
FR SPD OPN	FR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FL SPD OPN	FL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RR SPD OPN	RR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RL SPD OPN	RL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
EFI COM OPN	EFI communication open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
YAW RATE OPN	Yaw rate sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
DECELERAT OPN	Deceleration sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STEERING OPN	Steering angle sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
M/C OPN	Master cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-



- (d) While observing the screen, gently jiggle the connector or wire harness between the ECU and sensors, or between ECUs.

OK:

ERROR display does not change.

HINT:

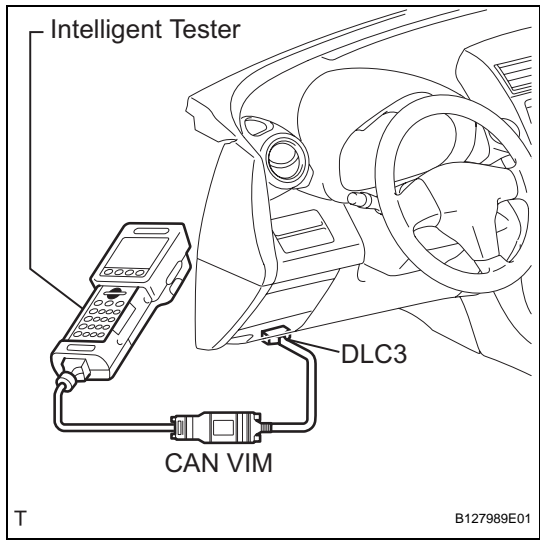
The connector and/or wire harness have a momentary interruption (open circuit) if the display changes. Repair or replace the connector and wire harness if either of them is faulty.

CALIBRATION

1. DESCRIPTION

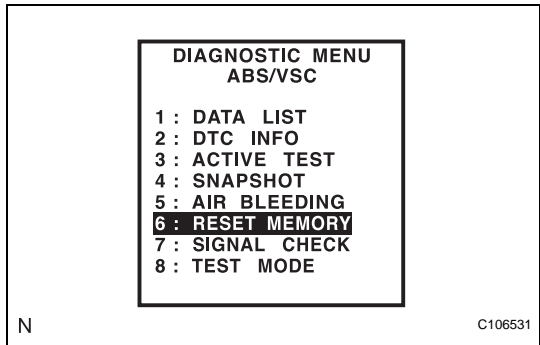
- (a) After replacing components relating to the VSC or performing "Front wheel alignment adjustment", clear and read the sensor calibration data.
- (b) Follow the chart to perform calibration.

Replacing Parts / Operation	Necessary Operation
Skid Control ECU	Yaw rate and deceleration sensor zero point calibration.
Yaw Rate Sensor	1. Clearing zero point calibration data 2. Yaw rate and deceleration sensor zero point calibration
Front Wheel Alignment Adjustment	1. Clearing zero point calibration data 2. Yaw rate and deceleration sensor zero point calibration



2. CLEAR ZERO POINT CALIBRATION DATA (When Using Intelligent Tester)

- (a) Clear the zero point calibration data.
 - (1) Connect the intelligent tester (with CAN VIM) to the DLC3.
 - (2) Turn the ignition switch ON.



- (3) Operate the intelligent tester to erase the codes (select "Reset Memory").

HINT:
Refer to the intelligent tester operator's manual for further details.
- (4) Using the intelligent tester, perform the zero point calibration of the yaw rate and deceleration sensor.

CAUTION:
If the ignition switch is turned ON for more than 15 seconds with the shift lever in the P position after zero point of the yaw rate and acceleration sensor has been cleared, only the zero point of the yaw rate sensor will be stored. If the vehicle is driven under this condition, the skid control ECU will recognize that zero point calibration of the acceleration sensor is not completed and will indicate that there is a malfunction in the VSC system using the indicator light.

3. PREFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR (When Using Intelligent Tester)

NOTICE:

- While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it stationary. (Do not start the engine.)
- Perform this on a level surface (with an inclination of less than 1°).

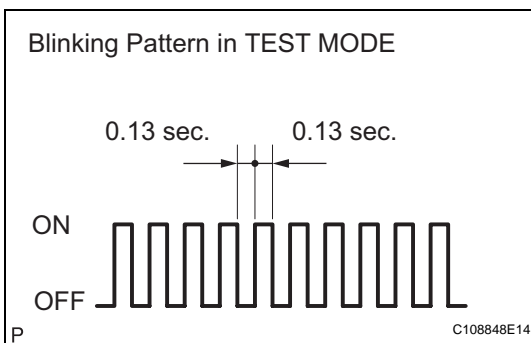
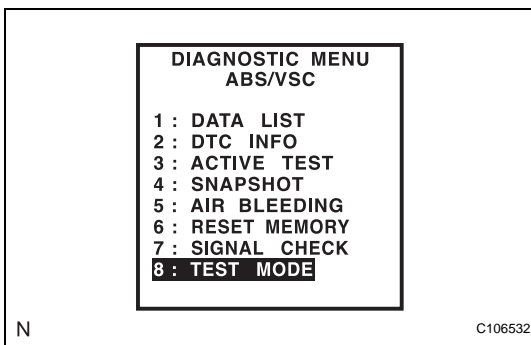
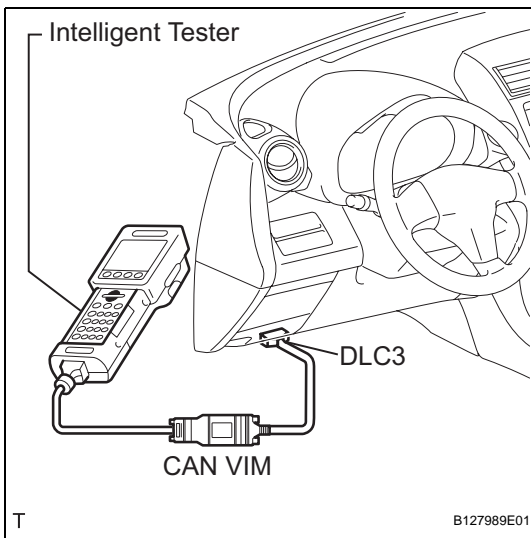
(a) Procedures for Test Mode.

- (1) Check that the shift lever is in the P position and apply the parking brake.

NOTICE:

DTCs C1210/36 and C1336/39 will be recorded if the shift lever is not the P position (see page BC-88).

- (2) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (3) Turn the ignition switch ON.



- (4) Set the intelligent tester to test mode (select "Test Mode").

HINT:

Refer to the intelligent tester operator's manual for further details.

- (b) Obtain the zero point of the yaw rate and deceleration sensor.

- (1) Keep the vehicle stationary on a level surface for 2 seconds or more.

- (2) Check that the VSC warning light blinks as shown in the illustration.

HINT:

- If the VSC warning light does not blink, perform the zero point calibration again.
- The zero point calibration is performed only once after the system enters test mode.
- Calibration cannot be performed again until the stored data is cleared once.

- (3) Turn the ignition switch OFF.

4. CLEAR ZERO POINT CALIBRATION DATA (When not Using Intelligent Tester)

- (a) Clear the zero point calibration data.
 - (1) Turn the ignition switch ON.
 - (2) The warning light and indicator light come on for 3 seconds to indicate that the initial check is completed.
 - (3) Using SST, connect and disconnect terminals 12 (TS) and 4 (CG) of the DLC3 4 times or more within 8 seconds.

SST 09843-18040

- (4) Check that the VSC warning light comes on.
- (5) Remove SST from the terminals of the DLC3.
- (6) Using a check wire, perform the zero point calibration of the yaw rate and deceleration sensor.

CAUTION:

If the ignition switch is turned ON for more than 15 seconds with the shift lever in the P position after zero point of the yaw rate and acceleration sensor has been cleared, only the zero point of the yaw rate sensor will be stored. If the vehicle is driven under this condition, the skid control ECU will recognize that zero point calibration of the acceleration sensor is not completed and will indicate that there is a malfunction in the VSC system using the indicator light.

5. PERFORM ZERO POINT CALIBRATION OF YAW RATE AND DECELERATION SENSOR (When not Using Intelligent Tester)

NOTICE:

- While obtaining the zero point, do not vibrate the vehicle by tilting, moving or shaking it and keep it stationary. (Do not start the engine.)
- Perform this on a level surface (with an inclination of less than 1°).

- (a) Procedures for Test Mode.
 - (1) Turn the ignition switch OFF.

- (2) Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.

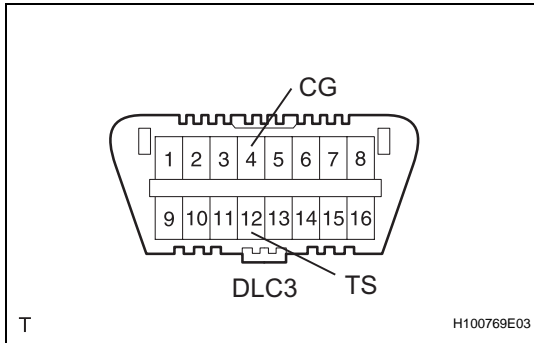
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- (3) Check that the shift lever is in the P position and apply the parking brake.

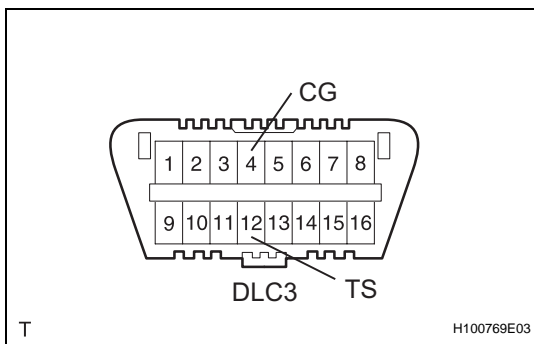
NOTICE:

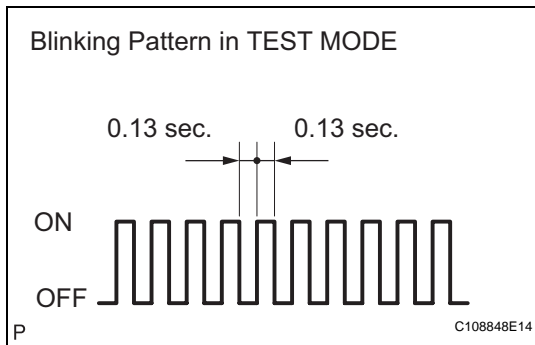
DTCs C1210/36 and C1336/39 will be recorded if the shift lever is not the P position (see page BC-88).

- (b) Obtain the zero point of the yaw rate and deceleration sensor.
 - (1) Turn the ignition switch ON.
 - (2) Keep the vehicle stationary on a level surface for 2 seconds or more.



BC





(3) Check that the VSC warning light blinks as shown in the illustration.

HINT:

- If the VSC warning light does not blink, perform the zero point calibration again.
- The zero point calibration is performed only once after the system enters test mode.
- Calibration cannot be performed again until the stored data is cleared once.

(4) Turn the ignition switch OFF.

TEST MODE PROCEDURE

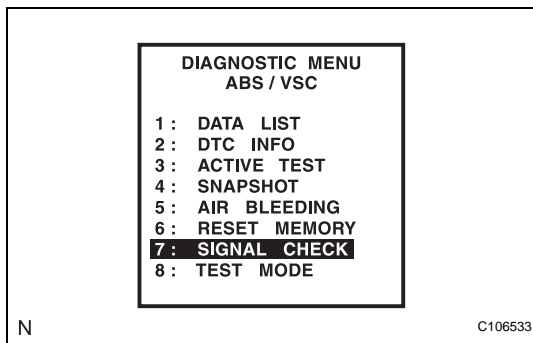
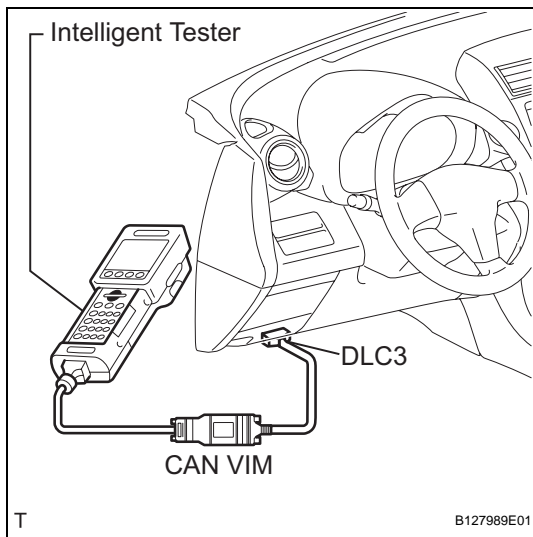
HINT:

- By switching the skid control ECU from normal mode to test mode, abnormality detection sensitivity is enhanced and troubleshooting can be conducted efficiently.
- Perform a sensor check in test mode after the speed sensor or sensor rotor has been repaired or replaced.
- If the ignition switch is turned from ON to ACC or OFF during test mode, DTCs related to the signal check function will be erased.
- During test mode, the skid control ECU stores all DTCs related to the signal check function, and the DTCs are erased if normality is confirmed. Any remaining DTCs are those indicating abnormalities that were found.

1. CHECK SENSOR SIGNAL BY TEST MODE (When Using Intelligent Tester)

(a) Procedures for test mode:

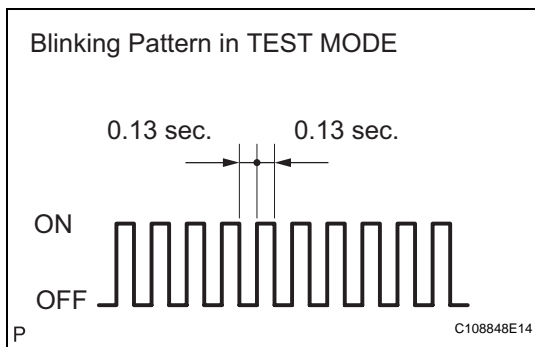
- (1) Turn the ignition switch OFF.
- (2) Check that the steering wheel is in the centered position.
- (3) Check that the shift lever is in the P position and apply the parking brake.
- (4) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (5) Turn the ignition switch ON.
- (6) Turn the tester on.



- (7) Set the intelligent tester to Test Mode (select "Signal Check").

HINT:

Refer to the intelligent tester operator's manual for further details.



- (8) Check that the ABS warning light and VSC warning light blink as shown in the illustration.

HINT:

If the ABS warning light and VSC warning light do not blink, check the TS and CG terminal circuit, and ABS and VSC warning light circuits.

Section Title	See procedure
ABS Warning Light does not Come ON	BC-138
VSC Warning Light does not Come ON	BC-142
TS and CG Terminal Circuit	BC-177

- (9) Start the engine.

- (b) w/ 16-inch disc only:

Check the lost booster pressure judgment and perform the master cylinder pressure sensor zero point calibration.

NOTICE:

Preform the check in the lost booster pressure state (negative pressure in the booster is depressurized).

- (1) Turn the ignition switch ON.
- (2) Check that the brake warning light comes on when depressing the brake pedal with a force of 59 N (6 kgf, 13.2 lbf) or more for 1 second or more. (The lost booster pressure state is judged normal.)
- (3) Start the engine depressing the brake pedal with a force of 59 N (6 kgf, 13.2 lbf) or more for 1 second or more.
- (4) Check that the brake warning light goes off when quickly releasing the brake pedal. (The lost booster pressure state is judged normal.)
- (5) Leave the vehicle for 1 second or more. (Master cylinder pressure sensor zero point calibration.)

NOTICE:

- If you slowly depress the brake pedal or depress it again, master cylinder pressure sensor zero point calibration is not performed normally.
- If the lost booster pressure judgment check is not completed normally, the master cylinder pressure sensor check is not judged.
- If a recheck is performed after the engine has started, end the Test Mode, enter Test Mode again, and release the vacuum in the booster by pumping the brake pedal prior to the recheck.

- (c) Check the deceleration sensor.
 (1) Keep the vehicle stationary on a level surface for 1 second or more.

HINT:

The deceleration sensor check can be performed together with the following master cylinder pressure sensor check.

- (d) Check the master cylinder pressure sensor.
 (1) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second. Check that the ABS warning light remains illuminated for 3 seconds.

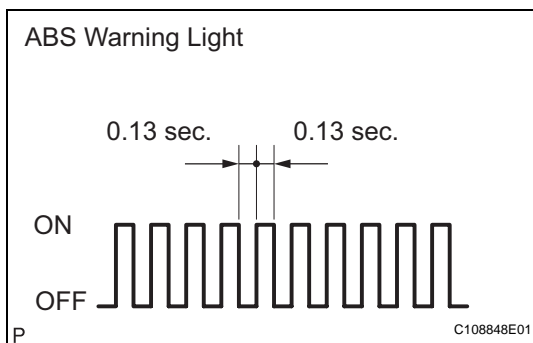
HINT:

- Ensure that the ABS warning light comes on.
- While the ABS warning light remains illuminated, continue depressing the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.

- (e) Check the speed sensor.
 (1) Check that the ABS warning light is blinking as shown in the illustration.
 (2) Check the speed sensor signal.
 1. Drive the vehicle straight forward at a speed of 45 km/h (28 mph) or more for several seconds.
 2. Check that the ABS warning light goes off.

NOTICE:

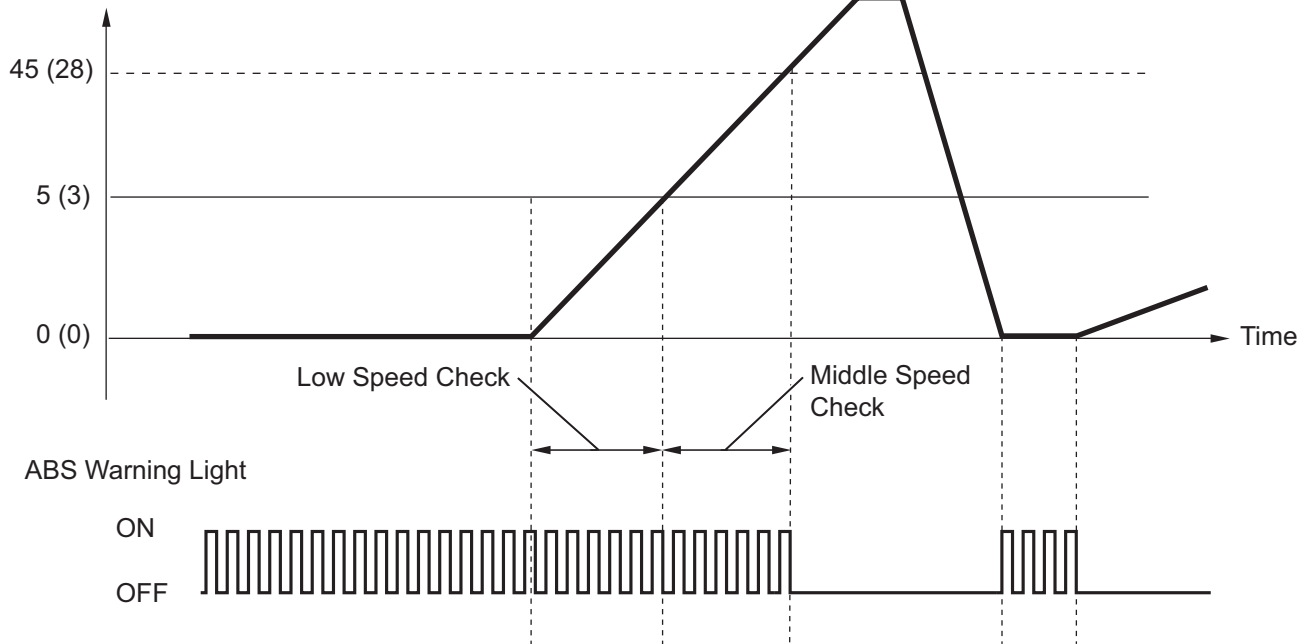
- The speed sensor check may not be completed if the sensor check is started with the steering wheel turned or one or more wheels spinning.
- If the speed sensor check is commenced while the steering wheel is turned, the ABS warning light may come on after the low speed check is finished.
- The ABS warning light comes on immediately when an abnormality is detected.
- When the speed sensor signal is normal, the ABS warning light goes off while driving at 45 km/h (28 mph) or more, and blinks in the test mode pattern while the vehicle is stationary.

BC

- Do not drive the vehicle at a speed of 80 km/h (50 mph) or more after the ABS warning light turns off, because test mode DTCs are set again when the vehicle speed exceeds 80 km/h (50 mph).

Blinking pattern in speed sensor check:

Vehicle Speed: km/h (mph)



BC

Y

C115115E04

3. Stop the vehicle.

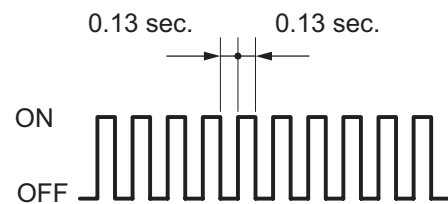
(f) Check the yaw rate sensor.

(1) Move the shift lever to P and set the parking brake lever.

(2) Check that the VSC warning light is blinking as shown in the illustration.

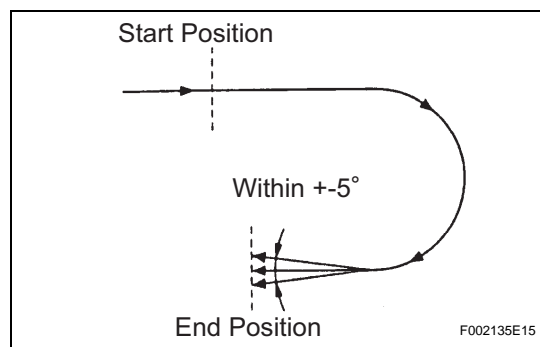
(3) Keep the vehicle stationary on a level surface for 1 second or more.

Blinking Pattern in TEST MODE



P

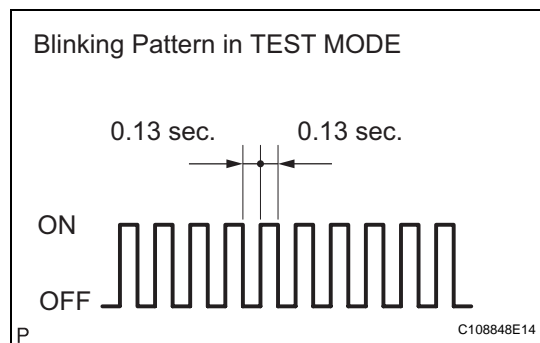
C108848E14



- (4) Shift the shift lever to the D position and drive the vehicle at a speed of approximately 5 km/h (3 mph), and turn the steering wheel either to the left or right 90° or more to turn the vehicle through 180°.
- (5) Stop the vehicle, move the shift lever into the P position, and then apply the parking brake.
- (6) Check that the skid control buzzer sounds for 3 seconds.

HINT:

- If the skid control buzzer sounds, the signal check has been completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (see page [BC-172](#)).
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check for DTCs.
- Drive the vehicle in a 180° semi circle. At the end of the turn, the direction of the vehicle should be within 180 +/-5° of its start position.
- Complete the vehicle turn within 20 seconds.
- Do not spin the wheels.

BC

- (g) w/ Downhill assist control only:
Check the downhill assist control operation switch.
 - (1) Check that the VSC warning light is blinking as shown in the illustration.
 - (2) Check the downhill assist control switch.
 1. Push the downhill assist control switch on.
 2. Push the downhill assist control switch off.
- (h) w/ Auto LSD only:
 - (1) Check that the AUTO LSD light illuminates only when the AUTO LSD switch is pressed.
- (i) Check the end of sensor.
 - (1) When the sensor check is successfully completed, the ABS warning light blinks in the test mode pattern when the vehicle is stopped, and goes off when the vehicle is driven.
- (j) Read the DTCs of signal check function.
 - (1) Read the DTC(s) by following the instructions on the tester screen.

NOTICE:

If the sensor check is not completed, the ABS warning light blinks even while the vehicle is driving and the ABS does not operate.

NOTICE:

- If only the DTCs are displayed, repair the malfunction area and clear the DTCs.
- If the DTCs or Test Mode codes (DTC of signal check function) are displayed, repair the malfunction area, clear the DTCs and perform the Test Mode inspection.

HINT:

See the list of the DTCs (refer to "DTC OF TEST MODE FUNCTION (SIGNAL CHECK)" below).

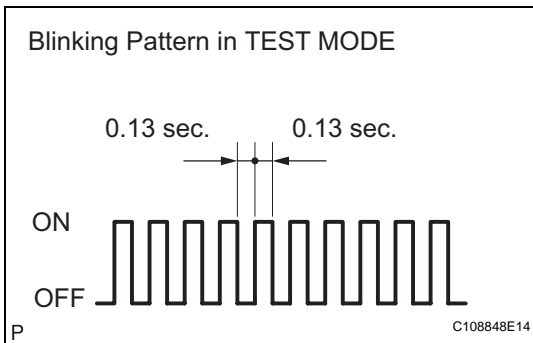
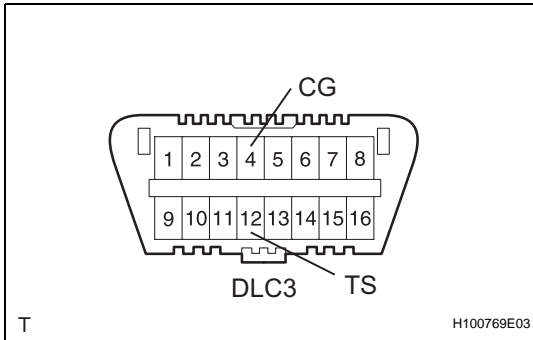
2. CHECK SENSOR SIGNAL BY TEST MODE (When not Using Intelligent Tester)

(a) Procedures for test mode:

- (1) Turn the ignition switch OFF.
- (2) Check that the steering wheel is in the centered position.
- (3) Check that the shift lever is in the P position and apply the parking brake.
- (4) Using SST, connect terminals 12 (TS) and 4 (CG) of the DLC3.

SST 09843-18040

- (5) Turn the ignition switch ON.



- (6) Check that the ABS warning light and VSC warning light blink as shown in the illustration.

HINT:

If the ABS warning light and VSC warning light and multi information display and master caution indicator light do not blink, check the TS and CG terminal circuit, and ABS and VSC warning light circuits.

Section Title	See procedure
ABS Warning Light does not Come ON	BC-138
VSC Warning Light does not Come ON	BC-142
TS and CG Terminal Circuit	BC-177

- (7) Start the engine.

(b) w/ 16-inch disc:

Check the lost booster pressure judgment and perform the master cylinder pressure sensor zero point calibration.

NOTICE:

Preform the check in the lost booster pressure state (negative pressure in the booster is depressurized).

- (1) Turn the ignition switch ON.
- (2) Check that the BRAKE warning light comes on when depressing the brake pedal with a force of 59 N (6 kgf, 13.2 lbf) or more for 1 second or more. (The lost booster pressure state is judged normal.)
- (3) Start the engine depressing the brake pedal with a force of 59 N (6 kgf, 13.2 lbf) or more for 1 second or more.

- (4) Check that the brake warning light goes off when quickly releasing the brake pedal. (The lost booster pressure state is judged normal.)
- (5) Leave the vehicle for 1 second or more. (Master cylinder pressure sensor zero point calibration.)

NOTICE:

- If you slowly depress the brake pedal or depress it again, master cylinder pressure sensor zero point calibration is not performed normally.
- If the lost booster pressure judgment check is not completed normally, the master cylinder pressure sensor check is not judged.
- If a recheck is performed after the engine has started, end the Test Mode, enter Test Mode again, and release the vacuum in the booster by pumping the brake pedal prior to the recheck.

- (c) Check the deceleration sensor.
 - (1) Keep the vehicle stationary on a level surface for 1 second or more.

HINT:

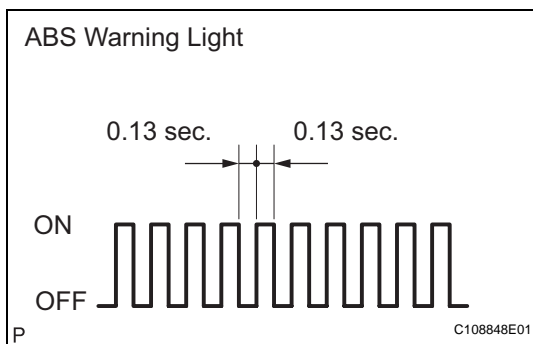
The deceleration sensor check can be performed together with the following master cylinder pressure sensor check.

- (d) Check the master cylinder pressure sensor.
 - (1) Leave the vehicle in a stationary condition and release the brake pedal for 1 second or more, and quickly depress the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more for 1 second. Check that the ABS warning light remains illuminated for 3 seconds.

HINT:

- Ensure that the ABS warning light comes on.
- While the ABS warning light remains illuminated, continue depressing the brake pedal with a force of 98 N (10 kgf, 22 lbf) or more.
- The ABS warning light comes on for 3 seconds every time the brake pedal operation above is performed.

- (e) Check the speed sensor.
 - (1) Check that the ABS warning light is blinking as shown in the illustration.
 - (2) Check the speed sensor signal.
 1. Drive the vehicle straight forward at a speed of 45 km/h (28 mph) or more for several seconds.



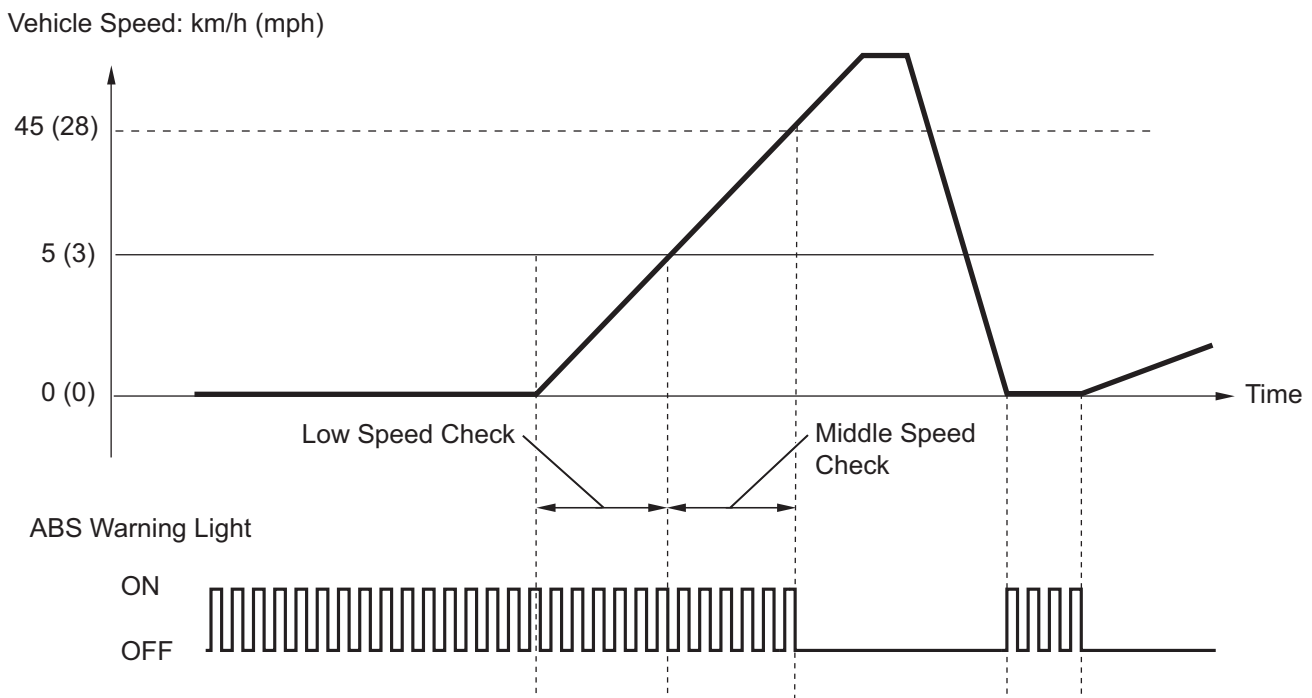
2. Check that the ABS warning light goes off.

NOTICE:

- The speed sensor check may not be completed if the sensor check is started with the steering wheel turned or one or more wheels spinning.
- If the speed sensor check is commenced while the steering wheel is turned, the ABS warning light may come on after the low speed check is finished.
- The ABS warning light comes on immediately when an abnormality is detected.
- When the speed sensor signal is normal, the ABS warning light goes off while driving at 45 km/h (28 mph) or more, and blinks in the test mode pattern while the vehicle is stationary.
- Do not drive the vehicle at a speed of 80 km/h (50 mph) or more after the ABS warning light turns off, because test mode DTCs are set again when the vehicle speed exceeds 80 km/h (50 mph).

BC

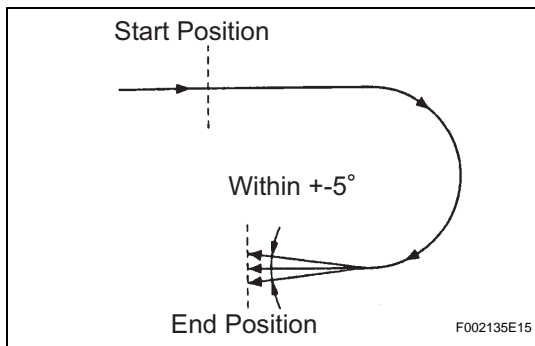
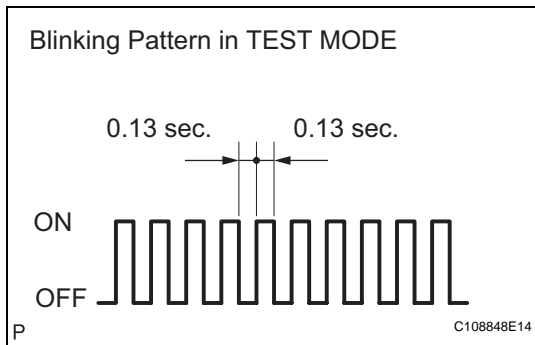
Blinking pattern in speed sensor check:



Y

C115115E04

3. Stop the vehicle.



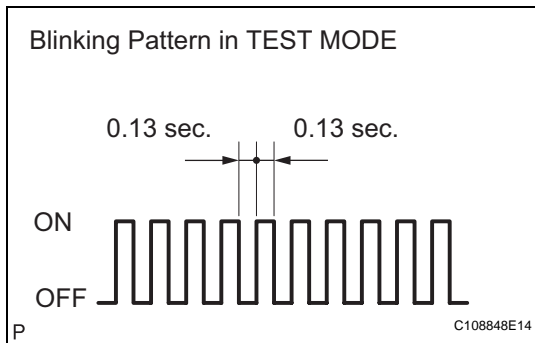
BC

- (f) Check the yaw rate sensor.
- (1) Move the shift lever to P and set the parking brake lever.
 - (2) Check that the VSC warning light is blinking as shown in the illustration.
 - (3) Keep the vehicle stationary on a level surface for 1 second or more.
- (4) Shift the shift lever to the D position and drive the vehicle at a speed of approximately 5 km/h (3 mph), and turn the steering wheel either to the left or right 90° or more to turn the vehicle through 180°.
- (5) Stop the vehicle, move the shift lever into the P position, and then apply the parking brake.
- (6) Check that the skid control buzzer sounds for 3 seconds.

HINT:

- If the skid control buzzer sounds, the signal check has been completed normally.
- If the skid control buzzer does not sound, check the skid control buzzer circuit (see page [BC-172](#)).
- If the skid control buzzer still does not sound, there is a malfunction in the yaw rate sensor, so check for DTCs.
- Drive the vehicle in a 180° semi circle. At the end of the turn, the direction of the vehicle should be within 180 $\pm 5^\circ$ of its start position.
- Complete the vehicle turn within 20 seconds.
- Do not spin the wheels.

- (g) w/ Downhill assist control only:
- Check the downhill assist control operation switch.
- (1) Check that the VSC warning light is blinking as shown in the illustration.
 - (2) Check the downhill assist control switch.
 1. Push the downhill assist control switch on.
 2. Push the downhill assist control switch off.



(h) w/ Auto LSD only:

Check the end of the sensor.

- (1) When the sensor check is successfully completed, the ABS warning light blinks in the test mode pattern when the vehicle is stopped, and goes off when the vehicle is driven.

NOTICE:

If the sensor check is not completed, the ABS warning light blinks even while the vehicle is driving and the ABS does not operate.

(i) Read the DTCs of the signal check function.

- (1) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

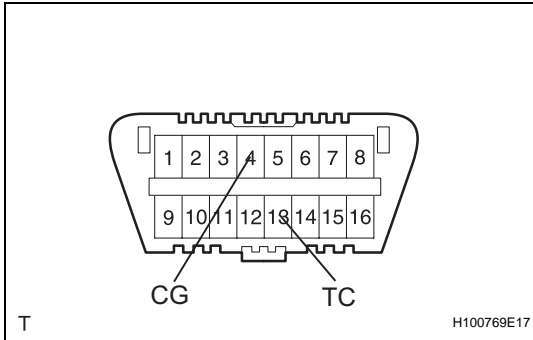
SST 09843-18040

- (2) Turn the ignition switch ON.

- (3) Count the number of blinks of the ABS and VSC warning light.

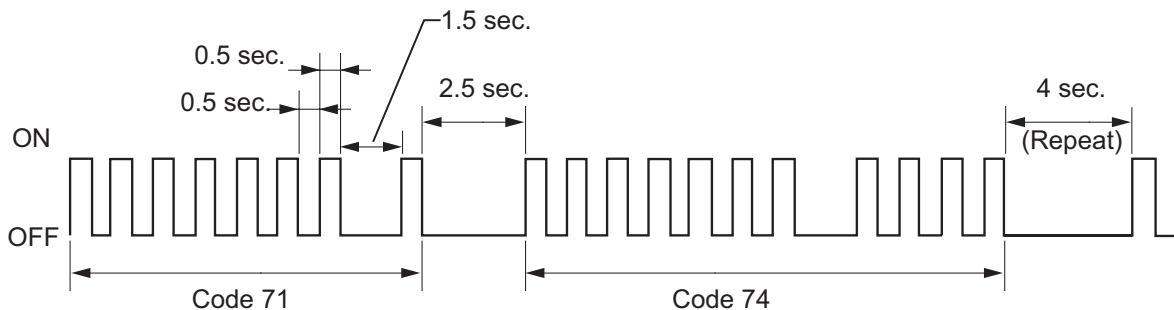
HINT:

As an example, the blinking patterns of DTCs 71 and 74 are shown below.



ABS and VSC Warning Light

Trouble Code of ABS (Example Codes 71 and 72):



C132134E01

NOTICE:

- If only DTCs are displayed, repair the malfunctioning area and clear the DTCs.
- If the DTCs or test mode codes (DTC of signal check function) are displayed, repair the malfunctioning area, clear the DTCs and perform the test mode inspection.)

HINT:

- If more than 1 malfunction is detected at the same time, the lowest numbered code will be displayed first.
- See the list of DTCs (refer to "DTC OF TEST MODE FUNCTION (SIGNAL CHECK)" below).

- If all sensors are normal, a normal system code is output (the light comes on for 0.25 seconds at intervals of 0.25 seconds).
- (4) After the check, disconnect SST from terminals 13 (TC) and 4 (CG) of the DLC3.
- (5) Turn the ignition switch OFF.

3. DTC OF TEST MODE FUNCTION (SIGNAL CHECK)

DTC of ABS sensor check function:

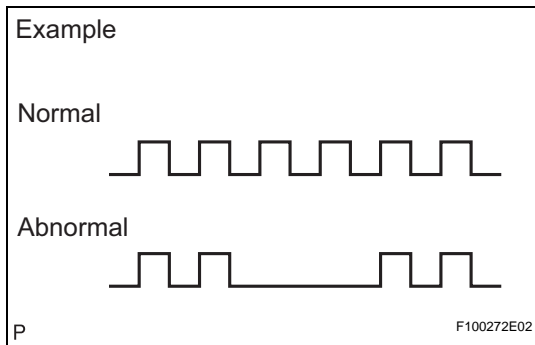
DTC No.	Diagnosis	Trouble Areas
C1271/71	Low output signal of front speed sensor RH	<ul style="list-style-type: none"> • Front speed sensor RH • Speed sensor circuit • Sensor installation
C1272/72	Low output signal of front speed sensor LH	<ul style="list-style-type: none"> • Front speed sensor LH • Speed sensor circuit • Sensor installation
C1273/73	Low output signal of rear speed sensor RH	<ul style="list-style-type: none"> • Rear speed sensor RH (for 4WD) • Skid control sensor RH (for 2WD) • Speed sensor circuit • Sensor installation
C1274/74	Low output signal of rear speed sensor LH	<ul style="list-style-type: none"> • Rear speed sensor LH (4WD) • Skid control sensor LH (2WD) • Speed sensor circuit • Sensor installation
C1275/75	Abnormal change in output signal of front speed sensor RH	<ul style="list-style-type: none"> • Sensor installation • Speed sensor rotor • Foreign matter on sensor tip or sensor rotor
C1276/76	Abnormal change in output signal of front speed sensor LH	<ul style="list-style-type: none"> • Sensor installation • Speed sensor rotor • Foreign matter on sensor tip or sensor rotor
C1277/77	Abnormal change in output signal of rear speed sensor RH	<ul style="list-style-type: none"> • Sensor installation • Speed sensor rotor • Foreign matter on sensor tip or sensor rotor
C1278/78	Abnormal change in output signal of rear speed sensor LH	<ul style="list-style-type: none"> • Sensor installation • Speed sensor rotor • Foreign matter on sensor tip or sensor rotor
C1279/79	Deceleration sensor output voltage malfunction	<ul style="list-style-type: none"> • Yaw rate sensor • Sensor installation
C1281/81	Master cylinder pressure sensor output malfunction	<ul style="list-style-type: none"> • Master cylinder pressure sensor • Brake pedal load sensing switch (w/ 16-inch disc)

DTC of VSC sensor check function:

DTC No.	Diagnosis	Trouble Areas
C0371/71	Yaw rate sensor	Yaw rate sensor
C1379/74*	Downhill assist control operation switch	Downhill assist control switch

HINT:

- *: w/ Downhill assist control
- The DTCs in this table are only output in Test Mode.
- The detection of DTCs from C1271/71 to C1274/74 is completed before the vehicle speed reaches 5 km/h (3 mph).
- The detection of DTCs from C1275/75 to C1278/78 is completed before the vehicle speed reaches 45 km/h (28 mph).



- C1271/71 to C1274/74: The speed output from only one wheel is extremely low despite other wheel speed outputs reaching 5 km/h (3 mph).
- C1275/75 to C1278/78: The abnormal speed sensor output frequency is as shown in the illustration.

PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of the problem symptom. The potential causes of the symptoms are listed in order of probability in the "Suspected area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

NOTICE:

When replacing the ABS and TRACTION actuator or sensor, turn the ignition switch OFF.

Vehicle stability control system

Symptom	Suspected area	See page
ABS, BA and/or EBD does not operate	1. Check for DTCs again and make sure that normal system code displayed	BC-47
	2. IG power source circuit	BC-99
	3. Front speed sensor circuit	BC-62
	4. Rear speed sensor circuit	BC-69
	5. Check ABS and TRACTION actuator using intelligent tester (Check ABS and TRACTION actuator operation using ACTIVE TEST function). If abnormal, check hydraulic circuit for leakage.	BC-180
	6. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)	BC-181
ABS, BA and/or EBD does not operate efficiently	1. Check for DTCs again and make sure that normal system code displayed	BC-47
	2. Front speed sensor circuit	BC-62
	3. Rear speed sensor circuit	BC-69
	4. Stop light switch circuit	BC-105
	5. Check ABS and TRACTION actuator using intelligent tester (Check ABS and TRACTION actuator operation using ACTIVE TEST function). If abnormal, check hydraulic circuit for leakage.	BC-180
	6. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)	BC-181
VSC and/or TRC does not operate	1. Check for DTCs again and make sure that normal system code displayed	BC-47
	2. IG power source circuit	BC-99
	3. Check hydraulic circuit for leakage	-
	4. Front speed sensor circuit	BC-62
	5. Rear speed sensor circuit	BC-69
	6. Yaw rate sensor circuit	BC-96
	7. Steering angle sensor circuit	BC-92
	8. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)	BC-181
Sensor signal check cannot be performed	1. TS and CG terminal circuit	BC-177
	2. ABS and TRACTION actuator (skid control ECU)	BC-181

Symptom	Suspected area	See page
DTC check cannot be performed	1. Check for DTCs again and make sure that normal system code displayed	BC-47
	2. TC and CG terminal circuit	BC-174
	3. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)	BC-181
ABS warning light abnormal (Remains on)	1. ABS warning light circuit	BC-134
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
ABS warning light abnormal (Does not come on)	1. ABS warning light circuit	BC-138
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
VSC warning light abnormal (Remains on)	1. VSC warning light circuit	BC-139
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
VSC warning light abnormal (Does not come on)	1. VSC warning light circuit	BC-142
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
BRAKE warning light abnormal (Remains on)	1. BRAKE warning light circuit	-
	2. ABS and TRACTION actuator (skid control ECU)	BC-144
BRAKE warning light abnormal (Does not come on)	1. BRAKE warning light circuit	BC-151
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
SLIP indicator light abnormal (Remains on)	1. SLIP indicator light circuit	BC-152
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
SLIP indicator light abnormal (Does not come on)	1. SLIP indicator light circuit	BC-154
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
Skid control buzzer abnormal	1. Skid control buzzer circuit	BC-172
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
Downhill assist control does not operate*1	1. Check for DTCs again and make sure that normal system code displayed	BC-47
	2. Downhill assist control switch circuit	BC-119
	3. Downhill assist control indicator light circuit	BC-161
	4. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)	BC-181
Downhill assist control indicator light abnormal (Remains on)*1	1. Downhill assist control indicator light circuit	BC-156
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
Downhill assist control indicator light abnormal (Does not come on)*1	1. Downhill assist control indicator light circuit	BC-161
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
Hill-start assist control does not operate*2	1. ABS and TRACTION actuator (skid control ECU)	BC-181
AUTO LSD does not operate*3	1. Check for DTCs again and make sure that normal system code displayed	BC-47
	2. Auto LSD switch circuit	BC-169
	3. AUTO LSD indicator circuit	BC-169
	4. If symptoms still occur even after above circuits in suspected areas inspected and proved to be normal, replace ABS and TRACTION actuator (skid control ECU)	BC-181
AUTO LSD indicator light abnormal (Remains on)*3	1. AUTO LSD indicator circuit	BC-164
	2. ABS and TRACTION actuator (skid control ECU)	BC-181
AUTO LSD indicator light abnormal (Does not come on)*3	1. AUTO LSD indicator circuit	BC-169
	2. ABS and TRACTION actuator (skid control ECU)	BC-181

HINT:

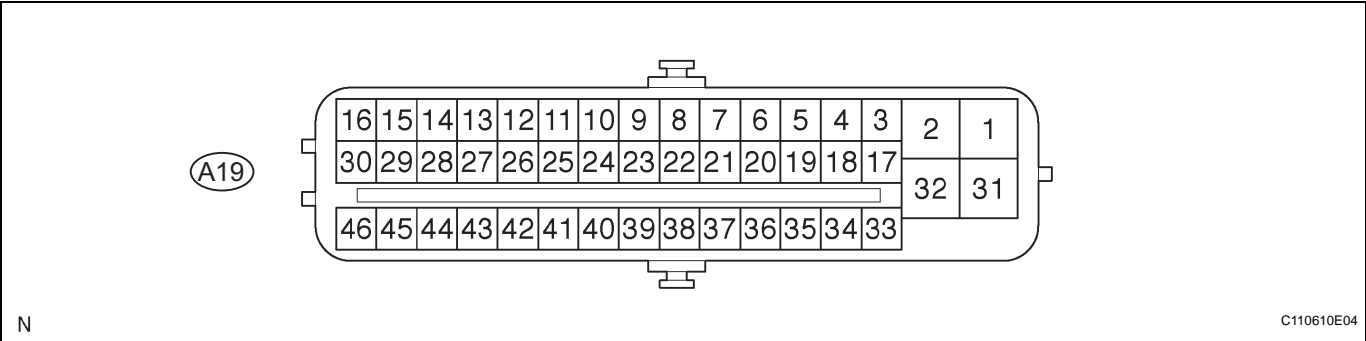
*1: w/ Downhill assist control

*2: w/ Hill-start assist control

*3: for 2WD w/ AUTO LSD

TERMINALS OF ECU

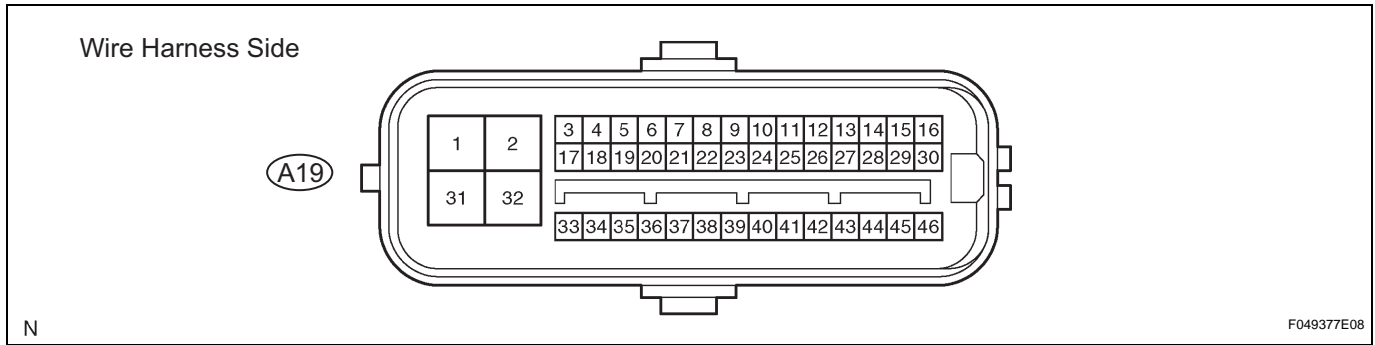
1. SKID CONTROL ECU



Symbols (Terminal No.)	Terminal Description
GND2 (A19-1)	Motor ground
BM (A19-2)	Motor relay input
FR+ (A19-3)	Front RH wheel speed sensor power supply
FL- (A19-4)	Front LH wheel speed signal input
RR+ (A19-5)	Rear RH wheel speed signal power supply
RL- (A19-6)	Rear LH wheel speed signal input
FSW+ (A19-7)*1	Brake pedal load sensing switch input
CANH (A19-11)	CAN communication line H
SP1 (A19-12)	Speed signal output for combination meter
MRF (A19-14)	Fail safe motor relay output
MR (A19-15)	Motor relay output
STPO (A19-16)	Stop light relay output
FR- (A19-17)	Front RH wheel speed signal input
FL+ (A19-18)	Front LH wheel speed sensor power supply
RR- (A19-19)	Rear RH wheel speed signal input
RL+ (A19-20)	Rear LH wheel speed sensor power supply
STP2 (A19-21)	Stop light relay input
TS (A19-24)	Sensor diagnosis check input
CANL (A19-25)	CAN communication line L
STP1 (A19-27)	Stop light switch input
HDCS (A19-28)*2	Downhill assist control switch input
+BS (A19-31)	Solenoid valve power supply
GND1 (A19-32)	Skid control ECU ground
CSW (A19-43)*3	AUTO LSD switch input
R+ (A19-45)	Power supply for motor relay
IG1 (A19-46)	ECU power supply

HINT:
*1: w/ 16-inch disc
*2: w/ Downhill assist control
*3: for 2WD (w/ AUTO LSD)

2. CHECK SKID CONTROL ECU



- Disconnect the A19 ECU connector.
- Measure the voltage and resistance of the wire harness side connector.

HINT:

The voltage cannot be measured with the connector connected to the skid control ECU as the connector is water resistant.

Skid control ECU:

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
GND2 (A19-1) - Body ground	W-B - Body ground	Skid control ECU ground	Always	Below 1 Ω
STP1 (A19-27) - Body ground	L - Body ground	Stop light switch input	Stop light switch OFF Brake pedal released	Below 1.5 V
STP1 (A19-27) - Body ground	L - Body ground	Stop light switch input	Stop light switch ON Brake pedal depressed	8 to 16 V
STP2 (A19-21) - Body ground	L - Body ground	Stop light relay input	Stop light switch OFF Brake pedal released	Below 1.5 V
STP2 (A19-21) - Body ground	L - Body ground	Stop light relay input	Stop light switch ON Brake pedal depressed	8 to 16 V
STPO (A19-16) - Body ground	W - Body ground	Stop light relay output	Always	10 to 14 V
+BS (A19-31) - Body ground	W - Body ground	Solenoid relay power supply	Always	10 to 14 V
IG1 (A19-46) - Body ground	L - Body ground	ECU power supply	Ignition switch ON	10 to 14 V
HDCS (A19-28)*2	Y - Body ground	Downhill assist control switch input	Downhill assist control switch ON	Below 1 Ω
HDCS (A19-28)*2	Y - Body ground	Downhill assist control switch input	Downhill assist control switch OFF	10 k Ω or higher
FSW+ (A19-7)*1	P - Body ground	Brake pedal load sensing switch input	Brake pedal load sensing switch ON Brake pedal released	202.4 to 223.7 Ω
FSW+ (A19-7)*1	P - Body ground	Brake pedal load sensing switch input	Brake pedal load sensing switch OFF Brake pedal released	0.95 to 1.05 k Ω
CSW (A19-43)*3	L - Body ground	AUTO LSD switch input	AUTO LSD switch ON	Below 1 Ω
CSW (A19-43)*3	L - Body ground	AUTO LSD switch input	AUTO LSD switch OFF	10 k Ω or higher

HINT:

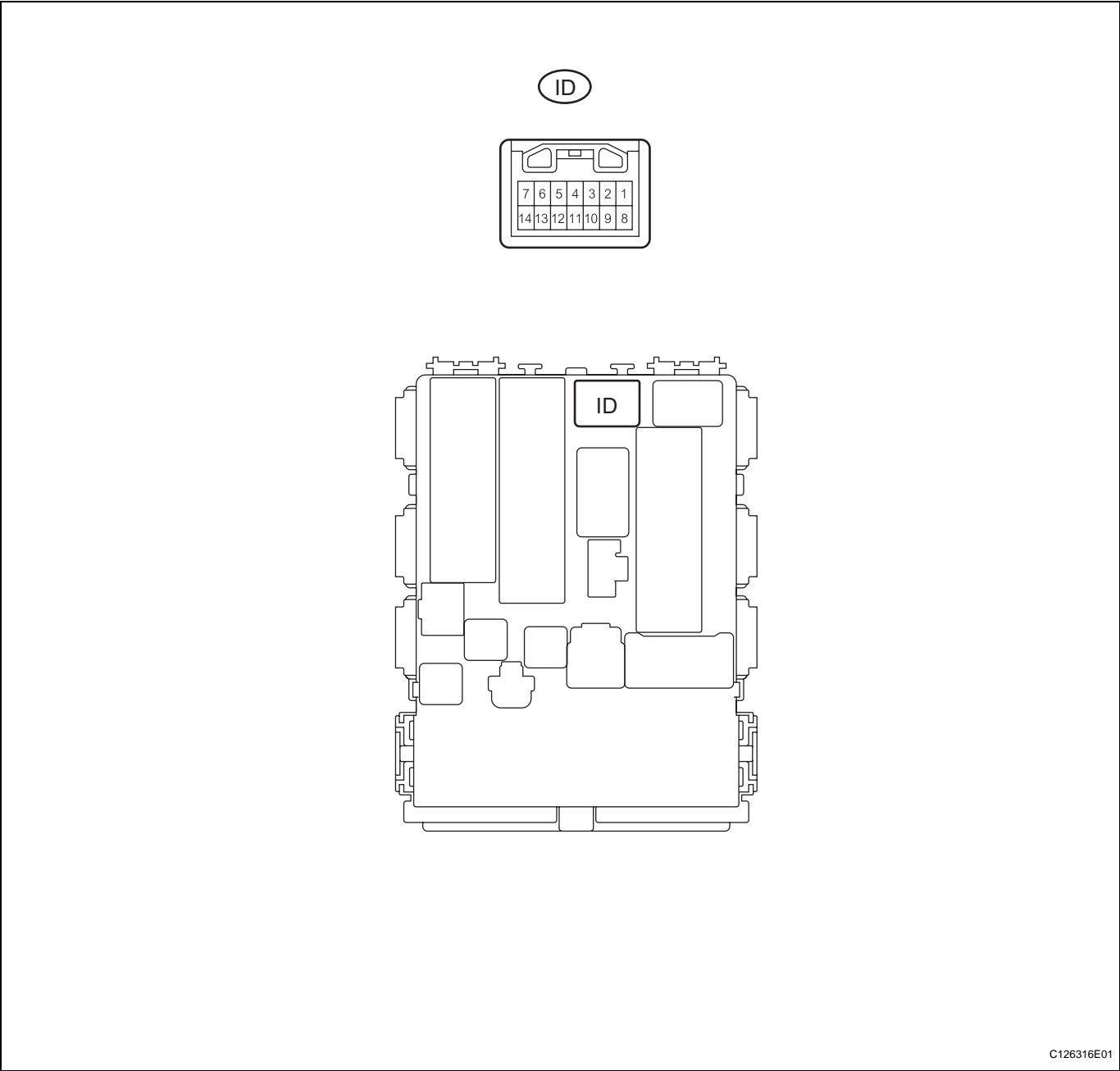
*1: w/ 16-inch disc

*2: w/ Downhill assist control

*3: for 2WD (w/ AUTO LSD)

If the result is not as specified, there may be a malfunction on the wire harness side.

3. CHECK INSTRUMENT PANEL JUNCTION BLOCK (MAIN BODY ECU)



C126316E01

- (a) Disconnect the ID junction block connector.
- (b) Measure the resistance of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
PKB (ID-4) - Body ground	B - Body ground	Parking brake switch input	Parking brake switch ON	Below 1 Ω
PKB (ID-4) - Body ground	B - Body ground	Parking brake switch input	Parking brake switch OFF	10 k Ω or higher

If the result is not as specified, there may be a malfunction on the wire harness side.

- (c) Reconnect the ID junction block connector.

- (d) Measure the voltage of the wire harness side connector.

Symbols (Terminal No.)	Wiring Color	Terminal Description	Condition	Specified Condition
PKB (ID-4) - Body ground	B - Body ground	Parking brake switch input	Parking brake switch ON	Below 1 V
PKB (ID-4) - Body ground	B - Body ground	Parking brake switch input	Parking brake switch OFF	10 to 14 V

If the result is not as specified, the junction block (ECU) may be a malfunction.

DIAGNOSIS SYSTEM

1. DIAGNOSIS

If the skid control ECU detects a malfunction, the ABS, VSC and brake warning lights and the slip, downhill assist control and AUTO LSD indicator lights come on in accordance with the trouble area to warn the driver. The table below indicates which lights come on when there are malfunctions in particular functions.

ABS Warning Light



VSC Warning Light

VSC

Brake Warning Light



Slip Indicator Light



AUTO LSD Indicator Light*2

**AUTO
LSD**

Downhill assist control Indicator Light*1



*1: w/ Downhill Assist Control

*2: for 2WD (w/ AUTO LSD)

C132117E03

Item / Trouble Area	ABS	EBD	BA (Brake Assist)	TRC	VSC	Downhill assist control*1	Hill-start assist control*2	AUTO LSD*3
ABS warning light	○	○	○	-	-	-	-	-
Brake warning light	-	○	○*4	-	-	-	-	-
VSC warning light	○	○	○	○	○	○	○	○
Slip indicator light	○	○	○	○	○	○	○	○
Downhill assist control indicator light*1	● (Downhill assist control switch ON)	● (Downhill assist control switch ON)	● (Downhill assist control switch ON)	● (Downhill assist control switch ON)	● (Downhill assist control switch ON)	● (Downhill assist control switch ON)	● (Downhill assist control switch ON)	● (Downhill assist control switch ON)
AUTO LSD indicator light*3	-	-	-	-	-	-	-	-

○: Light ON

●: Light ON (Blinking)

-: Light OFF

HINT:

- *1: w/ Downhill assist control
- *2: w/ Hill-start assist control
- *3: for 2WD w/ AUTO LSD

- *4: w/ 16-inch disc
- The DTCs can be read by connecting SST (09843-18040) between the TC and CG terminals of the DLC3 and observing the blinking pattern of the ABS and VSC warning lights, or by using an intelligent tester (see page [BC-47](#)).
- This system has a sensor signal check function (see page [BC-28](#)).

2. CHECK WARNING LIGHT AND INDICATOR LIGHT

- (a) Release the parking brake lever.

NOTICE:

Before releasing the parking brake lever, set chocks to hold the vehicle for safety.

HINT:

When the parking brake is applied or the brake fluid level is low, the brake warning light comes on.

- (b) When the ignition switch is turned ON, check that the ABS, VSC and brake warning lights and the slip, downhill assist control and AUTO LSD indicator lights come on and go off in about 3 seconds.

ABS Warning Light



VSC Warning Light

VSC

Brake Warning Light



Slip Indicator Light



AUTO LSD Indicator Light*2

**AUTO
LSD**

Downhill assist control
Indicator Light*1



*1: w/ Downhill Assist Control

*2: for 2WD (w/ AUTO LSD)

C132117E03

HINT:

If the warning lights do not illuminate, confirm whether the bulbs have burned out, and also check for CAN communication system DTCs, since the skid control ECU and combination meter are connected by the CAN communication line.

If the warning light remains on, perform relevant troubleshooting procedures. The relevant troubleshooting procedures are in the sections listed in the table below.

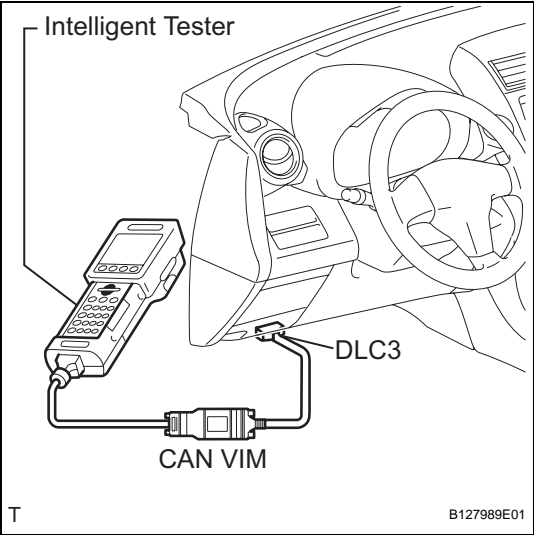
Section Title	See procedure
ABS Warning Light Remains ON	BC-134

Section Title	See procedure
VSC Warning Light Remains ON	BC-139
Brake Warning Light Remains ON	BC-144
Slip Indicator Light Remains ON	BC-152
Downhill assist control Indicator Light Remains ON	BC-156
AUTO LSD Indicator Light Remains ON	BC-164

DTC CHECK / CLEAR

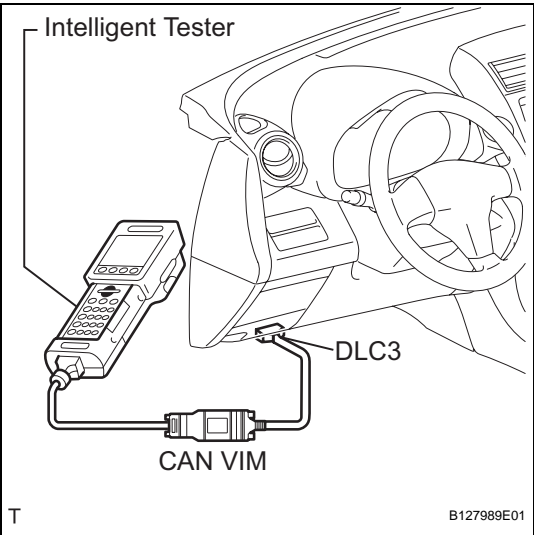
- CHECK DTC (When Using Intelligent Tester)**
 - Connect the intelligent tester (with CAN VIM) to the DLC3.
 - Turn the ignition switch ON.
 - Turn the tester on.
 - Read the DTCs by following the prompts on the tester screen.

HINT:
Refer to the intelligent tester operator's manual for further details.



- CLEAR DTC (When Using Intelligent Tester)**
 - Connect the intelligent tester (with CAN VIM) to the DLC3.
 - Turn the ignition switch ON.
 - Turn the tester on.
 - Operate the intelligent tester to clear the codes.

HINT:
Refer to the intelligent tester operator's manual for further details.



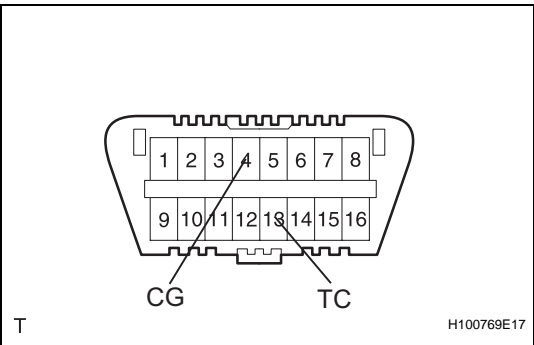
- CHECK DTC (When not Using Intelligent Tester)**
 - Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST 09843-18040

 - Turn the ignition switch ON.
 - Read DTCs from the ABS warning light on the combination meter.

HINT:

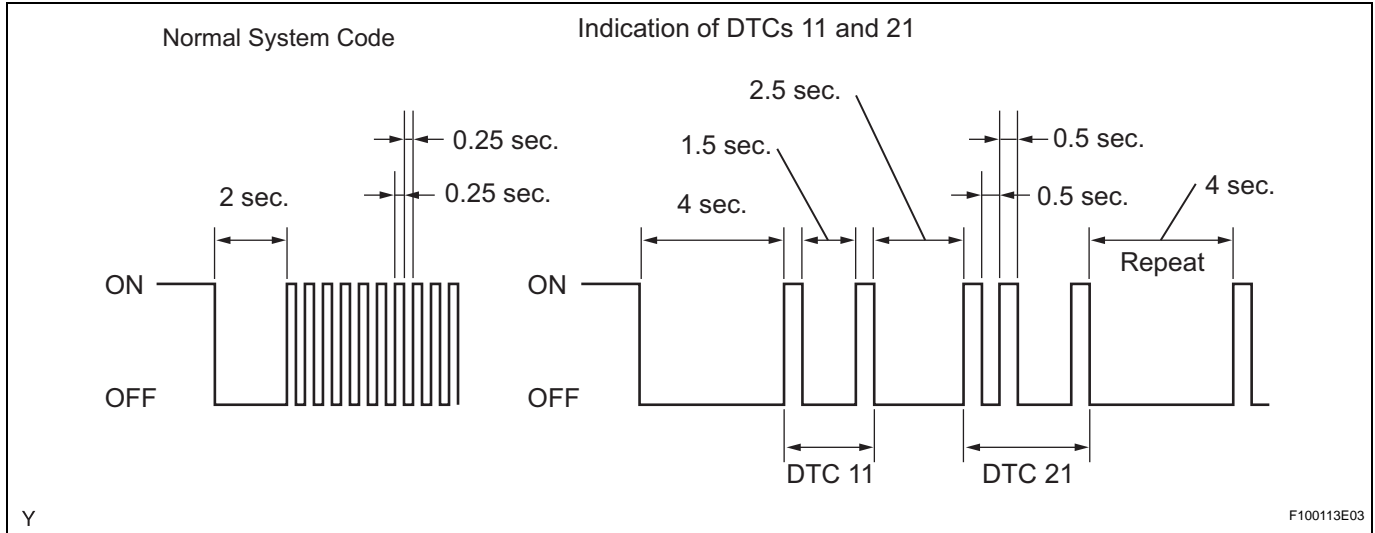
 - If the ABS warning light does not blink, perform relevant troubleshooting procedures. The relevant troubleshooting procedures are in the sections listed in the table below.



Trouble Area	See Procedure
ABS warning light circuit	BC-134 or BC-138

Trouble Area	See Procedure
VSC warning light circuit	BC-139 or BC-142
TC and CG terminal circuit	BC-174

- As an example, the blinking patterns of the normal system code and DTCs 11 and 21 are shown below.



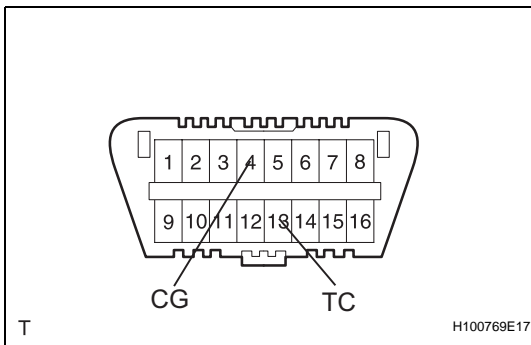
- DTCs are explained in the "DIAGNOSTIC TROUBLE CODE CHART" (see page [BC-57](#)).
- (d) After completing the check, disconnect SST from terminals 13 (TC) and 4 (CG) of the DLC3, and turn the ignition switch OFF.
- HINT:**
- If 2 or more malfunctions are detected at the same time, the lowest numbered DTC is displayed first.

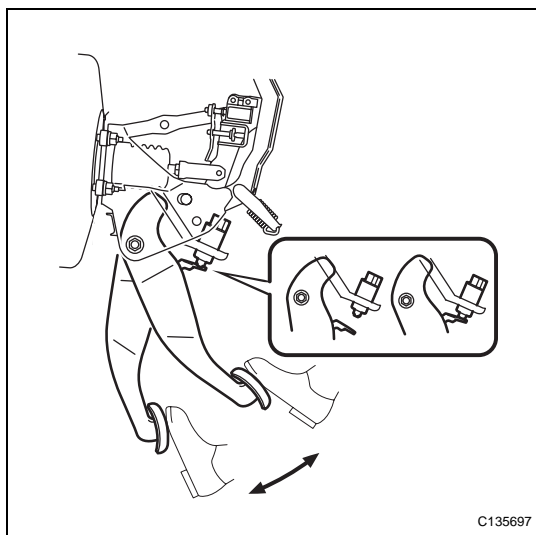
4. CLEAR DTC (When not Using Intelligent Tester)

- (a) Using SST, connect terminals 13 (TC) and 4 (CG) of the DLC3.

SST 09843-18040

- (b) Turn the ignition switch ON.





- (c) Clear the DTCs stored in the skid control ECU by depressing the brake pedal 8 times or more within 5 seconds.
- (d) Check that the ABS and VSC warning lights come on.
- (e) Remove SST from the terminals of the DLC3.
- (f) Turn the ignition switch OFF.

HINT:

Clearing the DTCs cannot be performed by removing the cable from the negative (-) battery terminal or the ECU-IG1 fuse.

5. END OF DTC CHECK/CLEAR

- (a) Turn the ignition switch ON.
- (b) Check that the ABS and VSC warning lights go off within approximately 3 seconds.
- (c) Turn the ignition switch OFF.

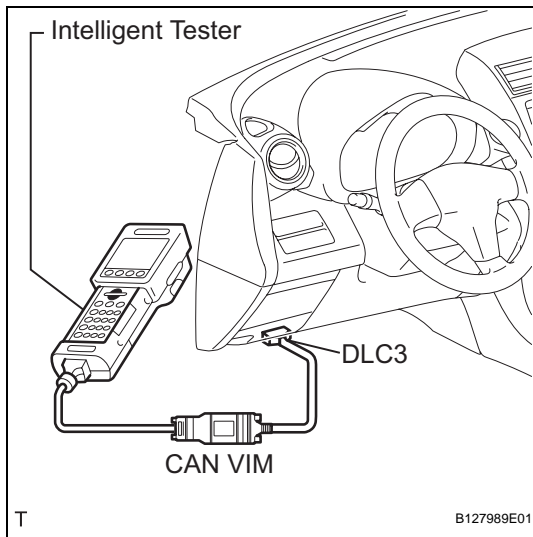
FREEZE FRAME DATA

1. FREEZE FRAME DATA

HINT:

- Whenever a DTC is detected or the ABS operates, the skid control ECU stores the current vehicle (sensor) state as freeze frame data.
- The skid control ECU stores the number of times (maximum: 31) the ignition switch has been turned from OFF to ON since the last time the ABS was activated. However, if the vehicle was stationary or running at a low speed (7 km/h [4.3 mph] or less), or if a DTC is detected, the skid control ECU stops counting.
- Freeze frame data at the time the ABS operates: The skid control ECU stores and updates the data whenever the ABS system operates. When the ECU stores data at the time a DTC is detected, the data stored when the ABS operated is erased.
- Freeze frame data at the time a DTC is detected: When the skid control ECU stores data at the time a DTC is detected, no updates will be performed until the data is cleared.

BC



- Connect the intelligent tester (with CAN VIM) to the DLC3.
- Turn the ignition switch ON.
- Turn the tester on.
- From the display on the tester, select "FREEZE FRAME DATA".

Item (Display)	Measurement Item	Reference Values
FREEZE TIME	Elapsed time after freeze frame data recorded	Min.: 0 ms Max.: 500 ms
#IG ON	Number of ignition switch ON operations since freeze frame data stored	1 to 31
BUZZER	Skid control buzzer signal	ON: Skid control buzzer ON OFF: Skid control buzzer OFF
STOP LAMP SW	Stop light switch signal	ON: Stop light switch ON OFF: Stop light switch OFF
PARKING BRAKE SW	Parking brake switch signal	ON: Parking brake switch ON OFF: Parking brake switch OFF
BRK PEDAL SW	Brake pedal load sensing switch signal	ON: Brake pedal released OFF: Brake pedal depressed

Item (Display)	Measurement Item	Reference Values
GEAR POSITION	Gear position information	FAIL 1st 2nd 3rd 4th 5th 6th P, N R NOT R
LEVER POSITION	Shift lever position information	FAIL 1st 2nd 3rd 4th 5th 6th/B D/M P, N R
OPERATED SYSTEM	Operated system status	ABS: ABS activated VSC: VSC activated TRC: TRC activated BA: BA activated FAIL: Fail safe mode activated HA-CTRL: Hill-start assist control activated SYS: System prohibited NON: No system activated
MAS CYL PRESS 1	Master cylinder pressure sensor reading	Brake pedal released: 0.3 V to 0.9 V Brake pedal depressed: 0.8 V to 4.5 V
M/C Sensor Grade	Master cylinder pressure sensor change	Min.: -30 MPa/s Max.: 225 MPa/s
YAW RATE	Yaw rate sensor reading	Min.: -128 deg/s Max.: 127 deg/s
STEERING SEN	Steering sensor reading	Left turn: Increase Right turn: Decrease
LATERAL G	Lateral G	Min.: -25.11 m/s ² Max.: 24.91 m/s ²
FORWARD&REA G	Forward and backward G	Min.: -25.11 m/s ² Max.: 24.91 m/s ²
FR WHEEL SPD	FR wheel speed	Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)
FL WHEEL SPD	FL wheel speed	Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)
RR WHEEL SPD	RR wheel speed	Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)
RL WHEEL SPD	RL wheel speed	Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)
VEHICLE SPD	Vehicle speed	Min.: 0 km/h (0 mph) Max.: 326.4 km/h (202.8 mph)
SPD GARDE	Vehicle speed grade	Min.: -25.11 m/s ² Max.: 24.91 m/s ²
ENGINE TORQUE	Real engine torque	Min.: -1024 Nm Max.: 1023 Nm
ACCELERATOR %	Accelerator pedal opening angle %	Min.: 0% Max.: 128%
INSPECTION MODE	Inspection mode	OTHER: Normal INSPECT: Service

FAIL-SAFE CHART

1. FAIL SAFE OPERATION

- If there is a problem with any sensor signals or actuator systems, the skid control ECU prohibits the power supply to the ABS and TRACTION actuator and informs the ECM of VSC system failure. The ABS and TRACTION actuator turns off the solenoids and the ECM shuts off VSC control (traction control signal) from the skid control ECU accordingly, the result being that it is as if the ABS, TRC and VSC systems were not installed.
- ABS control is prohibited, but EBD control continues as far as possible. If EBD control is impossible, the BRAKE warning light comes on to warn the driver (see page [BC-44](#)).
- If system components have any malfunctions before starting control, the operation stops immediately. If system components have any malfunctions during control, the control stops gradually so as not to trigger a sudden change in vehicle conditions. If it is impossible to control the systems, the warning light comes on to inform the driver of malfunctions in the systems (see page [BC-44](#)).

HINT:

- If the ABS system malfunctions, the brake system operates normally without the ABS system.
- If the brake actuator malfunctions, a gradual loss of brake performance is expected, and ABS system control is prohibited.

ABS, EBD and BA system

Malfunction Area	Fail-Safe Operation
ABS system	ABS, BA, TRC and VSC control prohibited
BA system	ABS, BA, TRC and VSC control prohibited
EBD system	ABS, EBD, BA, TRC and VSC control prohibited

TRC and VSC system:

Malfunction Area	Fail-Safe Operation
Engine control system (TRC and VSC systems)	Before control: Disables control During control: Uses only the brakes to effect control
Brake control system (VSC system)	Before control: Disables control During control: Uses only the engine to effect control
Brake control system (TRC system)	Before control: Disables control During control: Disables control (by gradually ending control)

DATA LIST / ACTIVE TEST

1. READ DATA LIST

HINT:

Using the intelligent tester's DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading the DATA LIST early in troubleshooting is one way to save time.

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Turn the intelligent tester on.
- (d) Read the DATA LIST according to the display on the tester.

Skid control ECU

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
ABS WARN LAMP	ABS warning light / ON or OFF	ON: ABS warning light ON OFF: ABS warning light OFF	-
VSC WARN LAMP	VSC warning light / ON or OFF	ON: VSC warning light ON OFF: VSC warning light OFF	-
BRAKE WARN LAMP	Brake warning light / ON or OFF	ON: Brake warning light ON OFF: Brake warning light OFF	-
SLIP INDI LAMP	Slip indicator light / ON or OFF	ON: Slip indicator light ON OFF: Slip indicator light OFF	-
D-HILL LIGHT*9	Downhill assist control indicator light / ON or OFF	ON: Downhill assist control switch ON OFF: Downhill assist control switch OFF	-
AUTO LSD LAMP*10	AUTO LSD indicator light / ON or OFF	ON: Traction control switch ON OFF: Traction control switch OFF	-
BUZZER	Skid control buzzer / ON or OFF	ON: Buzzer ON OFF: Buzzer OFF	-
STOP LAMP SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-
PARKING BRAKE SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-
BRK PEDAL SW	Brake pedal load sensing switch / ON or OFF	ON: Brake pedal depressed beyond the specified point OFF: Brake pedal not depressed beyond the specified point	-
IDLE SW	Main idle switch / ON or OFF	ON: Accelerator pedal released OFF: Accelerator pedal depressed	-
DAC SW*9	Downhill assist control switch / ON or OFF	ON: Downhill assist control switch ON ON: Downhill assist control switch ON	-
AUTO LSD SW*10	AUTO LSD switch / ON or OFF	ON: AUTO LSD switch ON ON: AUTO LSD switch ON	-
GEAR POSITION	Gear position information / P/N, R, 1st-6th, FAIL, NOT R	-	-
LEVER POSITION	Shift lever position information / P/N, R, D/M, 1st-6th/B, FAIL	-	-
SHIFT INFO	Shift information / ON or OFF	ON: During gear change	-
MAS CYL PRESS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	When brake pedal released: 0.3 to 0.9 V	Reading increases when brake pedal depressed
ZERO M/C SEN	Memorized zero point value of master cylinder pressure sensor / min.: -12.5 MPa, max.: 12.4 MPa	Min.: -12.5 MPa Max.: 12.4 MPa	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
DECELERAT SEN	Deceleration sensor 1 reading / min.: -18.52 m/s ² , max.: 18.39 m/s ²	Min.: -18.52 m/s ² Max.: 18.39 m/s ²	-
ZERO DECELERAT	Memorized zero point value of deceleration sensor 1 / min.: -25.11 m/s ² , max.: 24.91 m/s ²	Min.: -25.11 m/s ² Max.: 24.91 m/s ²	-
DECELERAT SEN 2	Deceleration sensor 2 reading / min.: -18.52 m/s ² , max.: 18.39 m/s ²	Min.: -18.52 m/s ² Max.: 18.39 m/s ²	-
ZERO DECELERAT 2	Memorized zero point value of deceleration sensor 2 / min.: -25.11 m/s ² , max.: 24.91 m/s ²	Min.: -25.11 m/s ² Max.: 24.91 m/s ²	-
YAW RATE SENS 1	Yaw rate sensor 1 reading / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
YAW RATE SENS 2	Yaw rate sensor 2 reading / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
ZERO YAW RATE	Memorized zero point value of yaw rate sensor 1 / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
STEERING SEN	Steering sensor reading / min.: -3276.8 deg, max.: 3276.7 deg	Left turn: Increase Right turn: Decrease	-
ZERO STEERING	Memorized zero point value of steering sensor / min.: -3276.8 deg, max.: 3276.7 deg	Min.: -3276.8 deg Max.: 3276.7 deg	-
LATERAL G	Lateral G / min.: -25.11 m/s ² , max.: 24.91 m/s ²	Min.: -25.11 m/s ² Max.: 24.91 m/s ²	-
FORWARD&REA G	Forward and rearward G / min.: -25.11 m/s ² , max.: 24.91 m/s ²	Min.: -25.11 m/s ² Max.: 24.91 m/s ²	-
YAW RATE VALUE	Yaw rate value / min.: -128 deg/s, max.: 127 deg/s	Min.: -128 deg/s Max.: 127 deg/s	-
STEERING ANGLE	Steering angle value / min.: -3276.8 deg, max.: 3276.7 deg	Min.: -3276.8 deg Max.: 3276.7 deg	-
FR WHEEL SPD	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)	Actual wheel speed	Similar to speed indicated on speedometer
FL WHEEL SPD	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)	Actual wheel speed	Similar to speed indicated on speedometer
RR WHEEL SPD	Wheel speed sensor (RR) reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)	Actual wheel speed	Similar to speed indicated on speedometer
RL WHEEL SPD	Wheel speed sensor (RL) reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)	Actual wheel speed	Similar to speed indicated on speedometer
VEHICLE SPD	Maximum speed sensor reading / min.: 0 km/h (0 mph), max.: 326.4 km/h (202.8 mph)	Actual wheel speed	Similar to speed indicated on speedometer
FR WHEEL ACCEL	FR wheel acceleration / min.: -200.84 m/s ² , max.: 199.27 m/s ²	Min.: -200.84 m/s ² Max.: 199.27 m/s ²	-
FL WHEEL ACCEL	FL wheel acceleration / min.: -200.84 m/s ² , max.: 199.271 m/s ²	Min.: -200.84 m/s ² Max.: 199.27 m/s ²	-
RR WHEEL ACCEL	RR wheel acceleration / min.: -200.84 m/s ² , max.: 199.27 m/s ²	Min.: -200.84 m/s ² Max.: 199.27 m/s ²	-
RL WHEEL ACCEL	RL wheel acceleration / min.: -200.84 m/s ² , max.: 199.27 m/s ²	Min.: -200.84 m/s ² Max.: 199.27 m/s ²	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
FR ABS STATUS	FR wheel ABS control status / ON or OFF	ON: During control	-
FL ABS STATUS	FL wheel ABS control status / ON or OFF	ON: During control	-
RR ABS STATUS	RR wheel ABS control status / ON or OFF	ON: During control	-
RL ABS STATUS	RL wheel ABS control status / ON or OFF	ON: During control	-
RR EBD STATUS	RR wheel EBD control status / ON or OFF	ON: During control	-
RL EBD STATUS	RL wheel EBD control status / ON or OFF	ON: During control	-
BA STATUS	BA control status / ON or OFF	ON: During control	-
TRAC STATUS	TRC control status / ON or OFF	ON: During control	-
TRAC ENG STATUS	TRC engine control status / ON or OFF	ON: During control	-
TRAC BRK STATUS	TRC brake control status / ON or OFF	ON: During control	-
FR VSC STATUS	FR wheel VSC control status / ON or OFF	ON: During control	-
FL VSC STATUS	FL wheel VSC control status / ON or OFF	ON: During control	-
RR VSC STATUS	RR wheel VSC control status / ON or OFF	ON: During control	-
RL VSC STATUS	RL wheel VSC control status / ON or OFF	ON: During control	-
ENG REVOLUTIONS	Engine revolutions / min.: 0 r/min, max.: 65535 r/min	-	-
ENGINE TORQUE	Real engine torque / min.: -1024 Nm, max.: 1023 Nm	-	-
ACCELERATOR %	Percentage of accelerator pedal opening angle / min.: 0%, max.: 128%	-	-
SOL RELAY	Solenoid relay / ON or OFF	ON: Solenoid relay ON OFF: Solenoid relay OFF	-
ELECTRONICALLY CONTROLLED BRAKE SYSTEM MTR RELAY	Electronically Controlled Brake System Motor relay (VSC1 relay) / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
FAIL MTR RELAY	Fail-safe motor relay / ON or OFF	ON: Motor relay ON OFF: Motor relay OFF	-
SM2	TRC / VSC solenoid (SM2) / ON or OFF	ON: Operates	-
SM1	TRC / VSC solenoid (SM1) / ON or OFF	ON: Operates	-
SFRH*1	ABS solenoid (SFRH) / ON or OFF	ON: Operates OFF: Does not operate	-
SFRR*2	ABS solenoid (SFRR) / ON or OFF	ON: Operates OFF: Does not operate	-
SFLH*3	ABS solenoid (SFLH) / ON or OFF	ON: Operates OFF: Does not operate	-
SFLR*4	ABS solenoid (SFLR) / ON or OFF	ON: Operates OFF: Does not operate	-
SRRH*5	ABS solenoid (SRRH) / ON or OFF	ON: Operates OFF: Does not operate	-
SRRR*6	ABS solenoid (SRRR) / ON or OFF	ON: Operates OFF: Does not operate	-
SRLH*7	ABS solenoid (SRLH) / ON or OFF	ON: Operates OFF: Does not operate	-

Tester Display	Measurement Item/Range	Normal Condition	Diagnostic Note
SRLR*8	ABS solenoid (SRLR) / ON or OFF	ON: Operates OFF: Does not operate	-
FR SPD OPN	FR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FL SPD OPN	FL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RR SPD OPN	RR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RL SPD OPN	RL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
EFI COM OPN	EFI communication open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
YAW RATE OPN	Yaw rate sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
DECELERAT OPN	Deceleration sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STEERING OPN	Steering angle sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
M/C OPN	Master cylinder pressure sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
#DTC	Number of recorded DTCs/ min.: 0, max.: 255	Min.: 0 Max.: 255	-
INSPECTION MODE	Inspection mode / OTHER or INSPECT	-	-
#IG ON2	Number of ignition switch ON operations after entering the inspection mode / min.: 0, max.: 255	-	-

HINT:

- *1: SFRH (S: Solenoid, F: Front, R: Right, H: Holding)
- *2: SFRR (S: Solenoid, F: Front, R: Right, R: Reduction)
- *3: SFLH (S: Solenoid, F: Front, L: Left, H: Holding)
- *4: SFLR (S: Solenoid, F: Front, L: Left, R: Reduction)
- *5: SRRH (S: Solenoid, R: Rear, R: Right, H: Holding)
- *6: SRRR (S: Solenoid, R: Rear, R: Right, R: Reduction)
- *7: SRLH (S: Solenoid, R: Rear, L: Left, H: Holding)
- *8: SRLR (S: Solenoid, R: Rear, L: Left, R: Reduction)
- *9: w/ Downhill assist control
- *10: for 2WD (w/ AUTO LSD)

2. PARFORM ACTIVE TEST

HINT:

Performing the intelligent tester's ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to save time. The DATA LIST can be displayed during the ACTIVE TEST.

- (a) Connect the intelligent tester (with CAN VIM) to the DLC3.
- (b) Turn the ignition switch ON.
- (c) Turn the intelligent tester on.
- (d) Perform the ACTIVE TEST according to the display on the tester.

HINT:

- The ignition switch must be turned ON to proceed to the ACTIVE TEST using the intelligent tester.
- The ACTIVE TESTs of the ABS solenoid, ABS motor relay, ABS warning light and BRAKE warning light are available when the vehicle is stopped.
- The motors stop automatically after 5 seconds of activation to prevent them from being damaged. When the motors are driven repeatedly, certain intervals are required.
- Each solenoid stops automatically after 2 seconds of activation to prevent them from being damaged, and can be operated again after a certain interval.
- Do not depress the brake pedal while only the pressure reduction solenoid valves are on.
- Do not drive 2 or more solenoids simultaneously except to operate the pressure holding solenoid valves and pressure reduction solenoid valves of each wheel.

Skid control ECU

Tester Display	Test Part	Control Range
ABS WARN LAMP	Turns ABS warning light ON / OFF	Observe combination meter
VSC WARN LAMP	Turns VSC warning light ON / OFF	Observe combination meter
BRAKE WARN LAMP	Turns Brake warning light ON / OFF	Observe combination meter
SLIP INDI LAMP	Turns Slip indicator light ON / OFF	Observe combination meter
D-HILL LIGHT*1	Turns downhill assist control indicator light ON / OFF	Observe combination meter
AUTO LSD LAMP*2	Turns AUTO LSD indicator light ON / OFF	Observe combination meter
BUZZER	Turns skid control buzzer ON / OFF	Buzzer can be heard
STP LAMP RELAY	Turns stop light relay (BRK relay) ON / OFF	Operation sound of motor can be heard
SOL RELAY	Turns ABS solenoid relay ON / OFF	-
MOTOR RELAY	Turns ABS motor relay ON / OFF	Operation sound of motor can be heard
SRLR	Turns ABS solenoid (SRLR) ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SRLH	Turns ABS solenoid (SRLH) ON / OFF	Operation sound of solenoid (clicking sound) can be heard

Tester Display	Test Part	Control Range
SRRR	Turns ABS solenoid (SRRR) ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SRRH	Turns ABS solenoid (SRRH) ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SFLR	Turns ABS solenoid (SFLR) ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SFLH	Turns ABS solenoid (SFLH) ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SFRR	Turns ABS solenoid (SFRR) ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SFRH	Turns ABS solenoid (SFRH) ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SMR	Turns VSC / TRC solenoid (SMR) ON / OFF	Operation sound of solenoid (clicking sound) can be heard
SMF	Turns VSC / TRC solenoid (SMF (BA-SOL)) ON / OFF	Operation sound of solenoid (clicking sound) can be heard

HINT:

*1: w/ Downhill assist control

*2: for 2WD (w/ AUTO LSD)

DIAGNOSTIC TROUBLE CODE CHART

HINT:

- If no abnormality is found when inspecting parts, check the skid control ECU and check for poor contact at the ground points.
- If a DTC is displayed during the DTC check, check the circuit for the DTC listed in the table below. For details of each DTC, refer to the page indicated.
- When 2 or more DTCs are detected, perform circuit inspections one by one until the problem is identified.
- All DTCs in the table below are detected in accordance with 1 trip detection logic.

DTC chart of ABS

DTC No.	Detection Item	Trouble Area	See page
C0200/31*1	Right Front Wheel Speed Sensor Signal	- Front speed sensor - Front speed sensor circuit - Sensor installation - Foreign matter on sensor rotor	BC-62
C0205/32*1	Left Front Wheel Speed Sensor Signal	- Front speed sensor - Front speed sensor circuit - Sensor installation - Foreign matter on sensor rotor	BC-62
C0210/33*1	Right Rear Wheel Speed Sensor Signal	- Skid control sensor RH (2WD) - Rear speed sensor RH (4WD) - Skid control sensor RH circuit (2WD) - Rear speed sensor RH circuit (4WD) - Sensor installation - Foreign matter on sensor rotor	BC-69
C0215/34*1	Left Rear Wheel Speed Sensor Signal	- Skid control sensor RH (2WD) - Rear speed sensor RH (4WD) - Skid control sensor RH circuit (2WD) - Rear speed sensor RH circuit (4WD) - Sensor installation - Foreign matter on sensor rotor	BC-69
C0226/21	SFR Solenoid Circuit	- ABS and TRACTION actuator	BC-76
C0236/22	SFL Solenoid Circuit	- ABS and TRACTION actuator	BC-76
C0246/23	SRR Solenoid Circuit	- ABS and TRACTION actuator	BC-76
C0256/24	SRL Solenoid Circuit	- ABS and TRACTION actuator	BC-76
C0273/13*1	Open in ABS Motor Relay Circuit	- ABS1 H-fuse - VSC MTR relay - VSC MTR relay circuit - VSC FAIL relay - VSC FAIL relay circuit - ABS and TRACTION actuator	BC-78
C0274/14	Short to B+ in ABS Motor Relay Circuit	- ABS1 H-fuse - VSC MTR relay - VSC MTR relay circuit - VSC FAIL relay - VSC FAIL relay circuit - ABS and TRACTION actuator	BC-78
C0278/11	Open in ABS Solenoid Relay Circuit	- ABS2 H-fuse - Wire harness (+BS circuit) - ABS and TRACTION actuator	BC-83
C0279/12	Short to B+ in ABS Solenoid Relay Circuit	- ABS2 H-fuse - Wire harness (+BS circuit) - ABS and TRACTION actuator	BC-83
C1225/25	SM Solenoid Circuit	- ABS and TRACTION actuator	BC-76

DTC No.	Detection Item	Trouble Area	See page
C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH	- Front speed sensor - Front speed sensor circuit - Sensor installation	BC-62
C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH	- Front speed sensor - Front speed sensor circuit - Sensor installation	BC-62
C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH	- Skid control sensor RH (2WD) - Rear speed sensor RH (4WD) - Skid control sensor RH circuit (2WD) - Rear speed sensor RH circuit (4WD) - Sensor installation	BC-69
C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH	- Skid control sensor RH (2WD) - Rear speed sensor RH (4WD) - Skid control sensor RH circuit (2WD) - Rear speed sensor RH circuit (4WD) - Sensor installation	BC-69
C1241/41	Low Battery Positive Voltage	- Battery - Charging system - Power source circuit - Internal power supply circuit of skid control ECU	BC-99
C1243/43*1	Acceleration Sensor Stuck Malfunction	- Yaw rate sensor - Yaw rate sensor circuit	BC-96
C1244/44	Open or Short in Deceleration Sensor Circuit	- Yaw rate sensor - Yaw rate sensor circuit	BC-96
C1245/45*1	Acceleration Sensor Output Malfunction	- Yaw rate sensor - Yaw rate sensor circuit	BC-96
C1246/46*2	Master Cylinder Pressure Sensor Malfunction	- Master cylinder pressure sensor - Master cylinder pressure sensor circuit - Stop light switch circuit - ABS and TRACTION actuator	BC-103
C1249/49	Open in Stop Light Switch Circuit	- STOP fuse - Stop light switch - Stop light switch circuit - ABS and TRACTION actuator - Stop light control relay	BC-105
C1251/51*1	Open in Pump Motor Circuit	- Wire harness - ABS and TRACTION actuator	BC-109
C1267/67*3	Brake Pedal Load Sensing Switch	- Brake pedal load sensing switch - Brake pedal load sensing switch circuit	BC-111
C1337/37	Different Diameter Tire Malfunction	- Tire size	BC-117
C1361/91	Short Circuit in ABS Motor Fail Safe Relay Circuit	- ABS1 H-fuse - VSC MTR relay - VSC MTR relay circuit - VSC FAIL relay - VSC FAIL relay circuit - ABS and TRACTION actuator	BC-78
C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction	- Yaw rate sensor - Yaw rate sensor circuit	BC-96
U0073/94	Control Module Communication Bus OFF	- CAN communication system	BC-130

HINT:

*1, *2

BC

Even after the trouble areas are repaired, the ABS warning light will not go off unless the following operations are performed.

- *1:
 - (a) Drive the vehicle at 20 km/h (12 mph) for 30 seconds or more and check that the ABS warning light goes off.
 - (b) Clear the DTC(s).
- *2:
 - (a) Keep the vehicle stationary for 5 seconds or more and depress the brake pedal lightly 2 or 3 times.
 - (b) Drive the vehicle at a vehicle speed of 50 km/h (31 mph) and keep depressing the brake pedal firmly for approximately 3 seconds.
 - (c) Repeat the above operation 3 times or more and check that the ABS warning light goes off.
 - (d) Clear the DTC(s).
- *3: 16-inch disc

DTC chart of VSC

DTC No.	Detection Item	Trouble Area	See page
C1201/51	Engine Control System Malfunction	- Engine control system	BC-85
C1203/53	ECM Communication Circuit Malfunction	- ECM	BC-87
C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone	- ABS and TRACTION actuator (skid control ECU) - Zero point calibration incomplete	BC-88
C1223/43	ABS Control System Malfunction	- Skid control ECU	BC-91
C1231/31	Steering Angle Sensor Circuit Malfunction	- Steering sensor - Steering sensor circuit - Steering sensor power supply - CAN communication system	BC-92
C1232/32	Stuck in Deceleration Sensor	- Yaw rate sensor - Yaw rate sensor circuit	BC-96
C1234/34	Yaw Rate Sensor Malfunction	- Yaw rate sensor - Yaw rate sensor circuit	BC-96
C1290/66	Steering Angle Sensor Zero Point Malfunction	- Yaw rate and deceleration sensor zero point calibration incomplete - Poor adjustment of centered position of steering wheel - Poor adjustment of front wheel alignment	BC-115
C1336/39	Zero Point Calibration of Acceleration Sensor Undone	- ABS and TRACTION actuator (skid control ECU) - Zero point calibration incomplete	BC-88
C1380/64	Stop Light Control Relay Malfunction	- Stop light assembly - Stop light switch circuit - STOP LP CTRL relay - ABS and TRACTION Actuator (skid control ECU)	BC-121
U0100/65	Lost Communication with ECM / PCM	- CAN communication system (Skid control ECU to ECM)	BC-130
U0123/62	Lost Communication with Yaw Rate Sensor Module	- CAN communication system (Skid control ECU to yaw rate and acceleration sensor)	BC-130
U0126/63	Lost Communication with Steering Angle Sensor Module	- CAN communication system	BC-130

DTC of ABS sensor check function

DTC No.	Detection Item	Trouble Area	See page
C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)	- Front speed sensor - Front speed sensor circuit - Sensor installation - Foreign matter on sensor rotor	BC-62
C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)	- Front speed sensor - Front speed sensor circuit - Sensor installation - Foreign matter on sensor rotor	BC-62
C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)	- Skid control sensor RH (2WD) - Rear speed sensor RH (4WD) - Skid control sensor RH circuit (2WD) - Rear speed sensor RH circuit (4WD) - Sensor installation - Foreign matter on sensor rotor	BC-69
C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)	- Skid control sensor RH (2WD) - Rear speed sensor RH (4WD) - Skid control sensor RH circuit (2WD) - Rear speed sensor RH circuit (4WD) - Sensor installation - Foreign matter on sensor rotor	BC-69
C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)	- Front speed sensor - Front speed sensor circuit - Sensor installation	BC-62
C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)	- Front speed sensor - Front speed sensor circuit - Sensor installation	BC-62
C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)	- Skid control sensor RH (2WD) - Rear speed sensor RH (4WD) - Skid control sensor RH circuit (2WD) - Rear speed sensor RH circuit (4WD) - Sensor installation	BC-69
C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)	- Skid control sensor RH (2WD) - Rear speed sensor RH (4WD) - Skid control sensor RH circuit (2WD) - Rear speed sensor RH circuit (4WD) - Sensor installation	BC-69
C1279/79	Deceleration Sensor Output Voltage Malfunction (Test Mode DTC)	- Yaw rate sensor - Yaw rate sensor circuit	BC-96
C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)	- Master cylinder pressure sensor - Master cylinder pressure sensor circuit - Stop light switch circuit - ABS and TRACTION actuator	BC-103
U0124/95	Lost Communication with Lateral Acceleration Sensor Module	- CAN communication system (Skid control ECU to yaw rate and acceleration sensor)	BC-130

DTC of VSC sensor check function

DTC No.	Detection Item	Trouble Area	See page
C0371/71	Yaw Rate Sensor (Test Mode DTC)	- Yaw rate sensor - Yaw rate sensor circuit	BC-96
C1379/74*	Downhill Assist Control Operation Switch (Test Mode DTC)	- Downhill assist control switch	BC-119

HINT:

*: w/ Downhill assist control

DTC	C0200/31	Right Front Wheel Speed Sensor Signal
DTC	C0205/32	Left Front Wheel Speed Sensor Signal
DTC	C1235/35	Foreign Object is Attached on Tip of Front Speed Sensor RH
DTC	C1236/36	Foreign Object is Attached on Tip of Front Speed Sensor LH
DTC	C1271/71	Low Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1272/72	Low Output Signal of Front Speed Sensor LH (Test Mode DTC)
DTC	C1275/75	Abnormal Change in Output Signal of Front Speed Sensor RH (Test Mode DTC)
DTC	C1276/76	Abnormal Change in Output Signal of Front Speed Sensor LH (Test Mode DTC)

BC**DESCRIPTION**

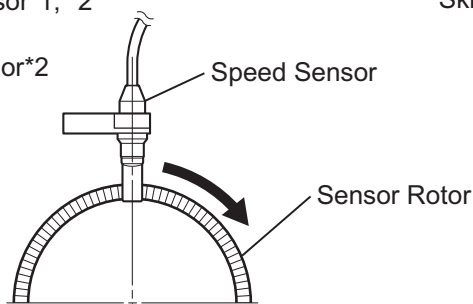
The speed sensors detect the wheel speeds and send appropriate signals to the skid control ECU. Speed sensor rotors have rows of alternating N and S magnetic poles, and their magnetic fields change as the rotors turn.

The speed sensors detect those magnetic changes and send pulse signals to the skid control ECU. The ECU monitors the wheel speeds through these pulse signals to control the ABS control system.

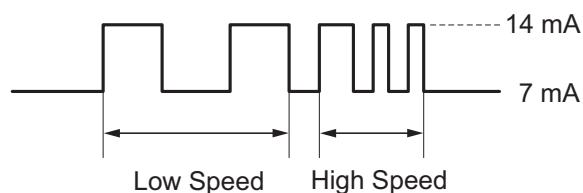
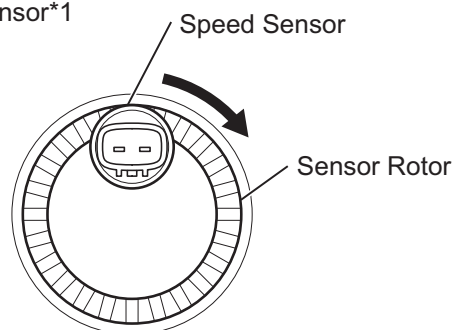
DTCs C1271/71, C1272/72, C1275/75 and C1276/76 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1271/71, C1272/72, C1275/75/75 and C1276/76 are output only in the test mode.

Front Speed Sensor*1, *2

Rear Speed Sensor*2



Skid Control Sensor*1



*1: for 2WD

*2: for 4WD

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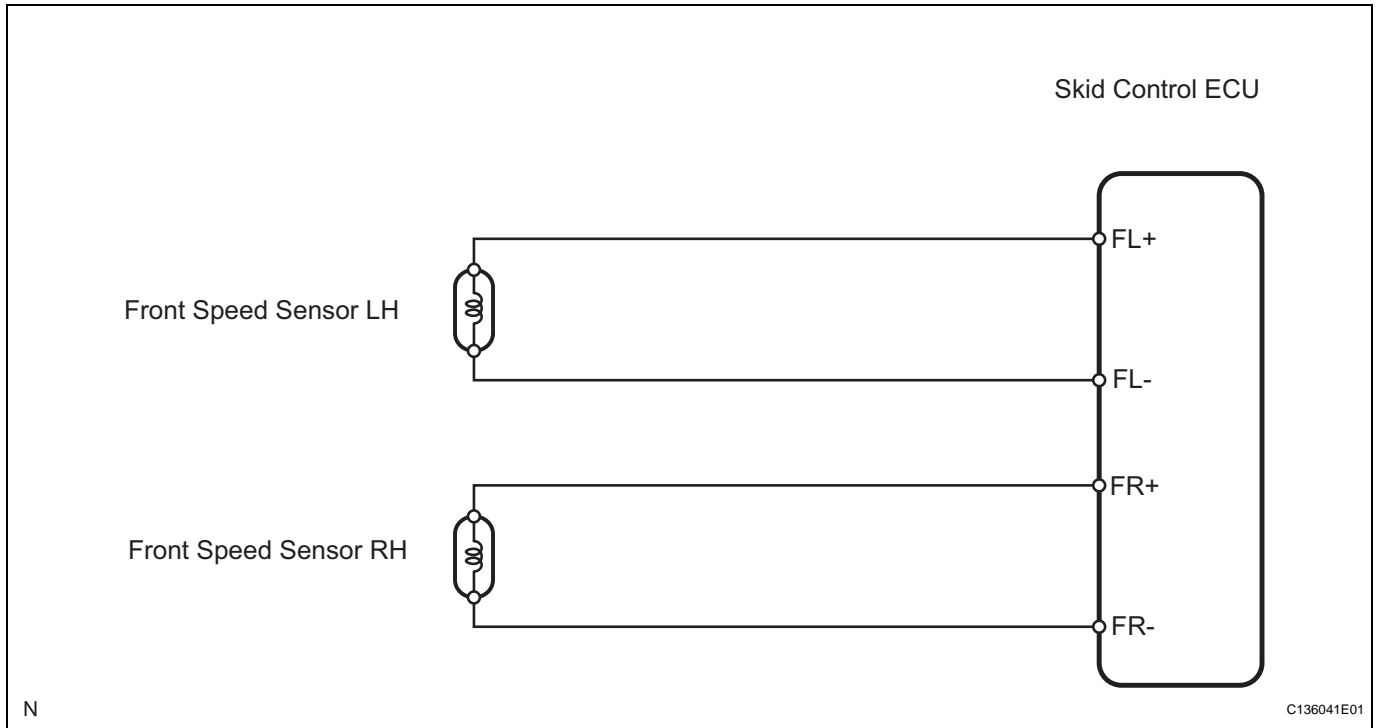
BC

DTC No.	DTC Detection Condition	Trouble Area
C0200/31 C0205/32	When one of following conditions is met: 1. At vehicle speed of 10 km/h (6 mph) or more, open or short in sensor signal circuit continues for 1 second or more. 2. Momentary interruption of sensor signal from abnormal wheel occurs 255 times or more. 3. Open in speed sensor signal circuit continues for 0.5 seconds or more. 4. With IG1 terminal voltage 9.5 V or more, sensor power supply voltage decreases for 0.5 seconds or more.	<ul style="list-style-type: none"> Front speed sensor Front speed sensor circuit Sensor installation Foreign matter on sensor rotor
C1235/35 C1236/36	When either of following is detected: 1. At vehicle speed of 20 km/h (12 mph) or more, noise in malfunctioning wheel sensor signal condition continues for 5 seconds or more. 2. At vehicle speed of 10 km/h (6 mph) or more, noise input occurs once per rotor rotation for 15 seconds or more.	<ul style="list-style-type: none"> Front speed sensor Front speed sensor circuit Sensor installation
C1271/71 C1272/72	Detected only during test mode.	<ul style="list-style-type: none"> Front speed sensor Front speed sensor circuit Sensor installation Foreign matter on sensor rotor
C1275/75 C1276/76	Detected only during test mode.	<ul style="list-style-type: none"> Front speed sensor Front speed sensor circuit Sensor installation

HINT:

- DTCs C0200/31 and C1235/35 relate to the front speed sensor RH.
- DTCs C0205/32 and C1236/36 relate to the front speed sensor LH.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:

Check the speed sensor signal in test mode after cleaning or replacement (see page [BC-28](#)).

1

CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

- (a) Using the DATA LIST of the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (see page [BC-23](#)).

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
FR SPD OPN	FR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
FL SPD OPN	FL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

CHECK AND REPAIR HARNESS AND CONNECTOR (SPEED SENSOR CIRCUIT)

OK

2 READ VALUE OF DATA LIST (FRONT SPEED SENSOR)

- (a) Check the DATA LIST for proper functioning of the front speed sensor.

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition
FR WHEEL SPD	Wheel speed sensor (FR) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202.8 mph)	Similar to speed indicated on speedometer
FL WHEEL SPD	Wheel speed sensor (FL) reading / min.: 0 km/h (0 mph), max.: 326 km/h (202.8 mph)	Similar to speed indicated on speedometer

OK:

There is almost no difference between actual wheel speed and displayed speed value.

HINT:

There is a tolerance of $\pm 10\%$ in the speedometer indication.

NG**Go to step 5****OK****BC****3 PERFORM TEST MODE INSPECTION (SIGNAL CHECK)**

- (a) Perform a TEST MODE inspection and check for DTCs (see page [BC-28](#)).

OK:

No DTC output.

NG

CHECK AND REPAIR HARNESS AND CONNECTOR (SPEED SENSOR CIRCUIT)

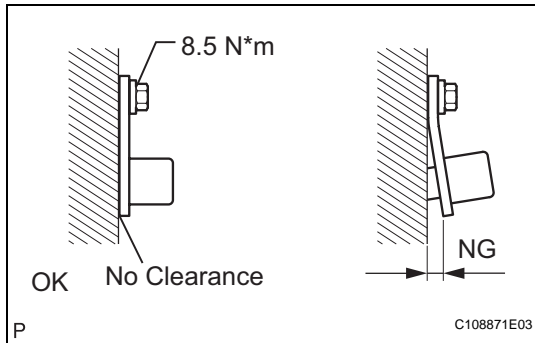
OK**4 RECONFIRM DTC**

- (a) Clear the DTC(s) (see page [BC-47](#)).
 (b) Start the engine.
 (c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
 (d) Check if the same DTC(s) is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**Go to step 10****A****END**

5 INSPECT FRONT SPEED SENSOR (INSTALLATION)

- (a) Check that the speed sensor installation bolt is tightened properly.

OK:

The installation bolt is tightened properly, and there is no clearance between the sensor and front steering knuckle.

Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

HINT:

If the installation portion of the sensor is dirty, clean it and reinstall the sensor.

Check the speed sensor after the speed sensor replacement (see page [BC-28](#)).

NG

TIGHTEN BOLT PROPERLY OR REPLACE FRONT SPEED SENSOR

OK

6 CHECK SPEED SENSOR (TIP)**BC**

- (a) Remove the front speed sensor.
(b) Check the sensor tip.

OK:

No scratches or foreign matter on the sensor tip.

HINT:

Check the speed sensor signal after the speed sensor clearing or replacement (see page [BC-28](#)).

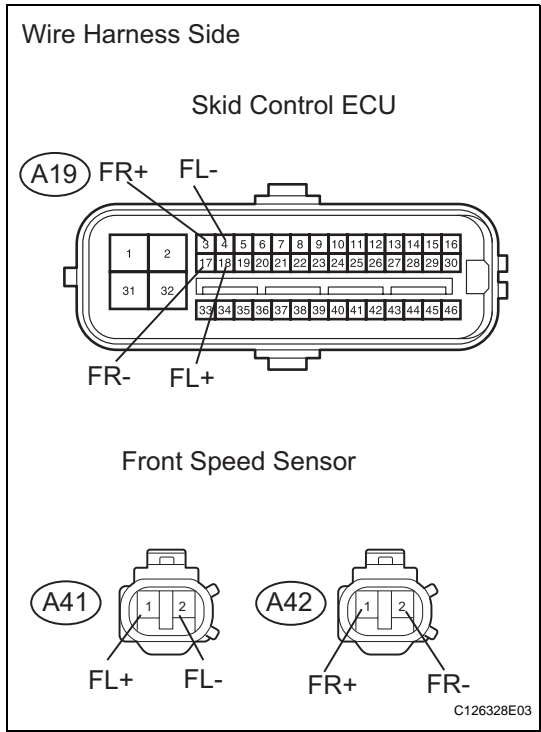
NG

CLEAN OR REPLACE FRONT SPEED SENSOR

OK

7

CHECK WIRE HARNESS (SKID CONTROL ECU - FRONT SPEED SENSOR)



- (a) Disconnect the A19 ECU connector.
- (b) Disconnect the A41 and A42 sensor connectors.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance:
for LH

Tester Connection	Specified Condition
A19-18 (FL+) - A41-1 (FL+)	Below 1 Ω
A19-4 (FL-) - A41-2 (FL-)	Below 1 Ω
A19-18 (FL+) - Body ground	10 kΩ or higher
A19-4 (FL-) - Body ground	10 kΩ or higher

for RH

Tester Connection	Specified Condition
A19-3 (FR+) - A42-1 (FR+)	Below 1 Ω
A19-17 (FR-) - A42-2 (FR-)	Below 1 Ω
A19-3 (FR+) - Body ground	10 kΩ or higher
A19-17 (FR-) - Body ground	10 kΩ or higher

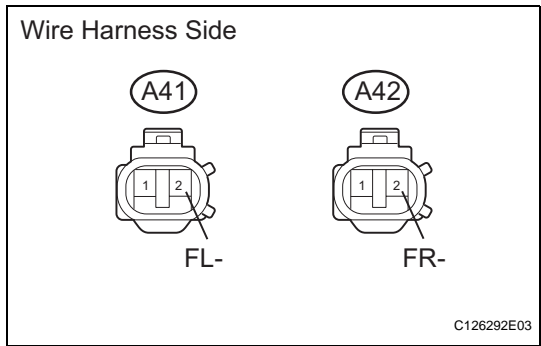
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

8

CHECK SKID CONTROL ECU (SENSOR INPUT VOLTAGE)



- (a) Disconnect the A41 and A42 sensor connectors.
 - (b) Measure the voltage of the wire harness side connector.
- Standard voltage

Tester Connection	Condition	Specified Condition
A41-2 (FL-) - Body ground	Ignition switch ON	5.7 to 17.3 V
A42-2 (FR-) - Body ground	Ignition switch ON	5.7 to 17.3 V

NG

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

OK

9

RECONFIRM DTC

- (a) Clear the DTC(s) (see page BC-47).
- (b) Start the engine.
- (c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.

- (d) Check if the same DTC(s) is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**END****A****10 REPLACE FRONT SPEED SENSOR**

- (a) Replace the front speed sensor.

NEXT**11 RECONFIRM DTC**

- (a) Clear the DTC(s) (see page [BC-47](#)).
(b) Start the engine.
(c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.

- (d) Check if the same DTC(s) is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**END****A****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****BC**

DTC	C0210/33	Right Rear Wheel Speed Sensor Signal
DTC	C0215/34	Left Rear Wheel Speed Sensor Signal
DTC	C1238/38	Foreign Object is Attached on Tip of Rear Speed Sensor RH
DTC	C1239/39	Foreign Object is Attached on Tip of Rear Speed Sensor LH
DTC	C1273/73	Low Output Signal of Rear Speed Sensor RH (Test Mode DTC)
DTC	C1274/74	Low Output Signal of Rear Speed Sensor LH (Test Mode DTC)
DTC	C1277/77	Abnormal Change in Output Signal of Rear Speed Sensor RH (Test Mode DTC)
DTC	C1278/78	Abnormal Change in Output Signal of Rear Speed Sensor LH (Test Mode DTC)

DESCRIPTION

Refer to DTC C0200/31 (see page [BC-62](#)).

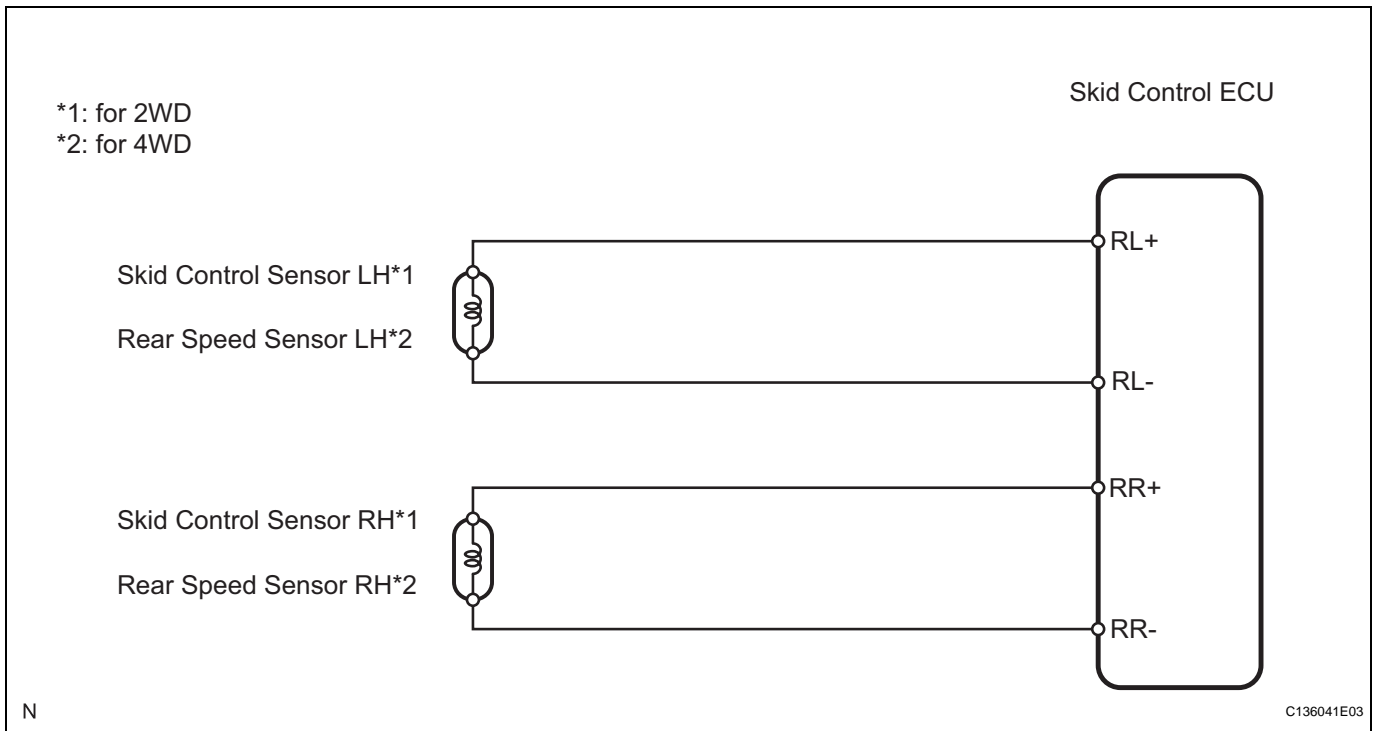
DTCs C1273/73, C1274/74, C1277/77 and C1278/78 can be deleted when the speed sensor sends a vehicle speed signal or the test mode ends. DTCs C1273/73, C1274/74, C1277/77 and C1278/78 are output only in the test mode.

DTC No.	DTC Detection Condition	Trouble Area
C0210/33 C0215/34	When one of following conditions is met: 1. At vehicle speed of 10 km/h (6 mph) or more, open or short in sensor signal circuit continues for 1 second or more. 2. Momentary interruption of sensor signal from abnormal wheel occurs 255 times or more. 3. Open in speed sensor signal circuit continues for 0.5 seconds or more. 4. With IG1 terminal voltage 9.5 V or more, sensor power supply voltage decreases for 0.5 seconds or more.	<ul style="list-style-type: none"> • Skid control sensor (for 2WD) • Rear speed sensor (for 4WD) • Skid control sensor circuit (for 2WD) • Rear speed sensor circuit (4WD) • Sensor installation • Foreign matter on sensor rotor
C1238/38 C1239/39	When either condition below is met: 1. At vehicle speed of 20 km/h (12 mph) or more, noise in malfunctioning wheel sensor signal condition continues for 5 seconds or more. 2. At vehicle speed of 10 km/h (6 mph) or more, noise input occurs once per rotor rotation for 15 seconds or more.	<ul style="list-style-type: none"> • Skid control sensor (for 2WD) • Rear speed sensor (for 4WD) • Skid control sensor circuit (for 2WD) • Rear speed sensor circuit (for 4WD) • Sensor installation
C1273/73 C1274/74	Detected only during test mode.	<ul style="list-style-type: none"> • Skid control sensor (for 2WD) • Rear speed sensor (for 4WD) • skid control sensor circuit (for 2WD) • Rear speed sensor circuit (for 4WD) • Sensor installation • Foreign matter on sensor rotor

DTC No.	DTC Detection Condition	Trouble Area
C1277/77 C1278/78	Detected only during test mode.	<ul style="list-style-type: none"> Skid control sensor (for 2WD) Rear speed sensor (for 4WD) Skid control sensor circuit (for 2WD) Rear speed sensor circuit (for 4WD) Sensor installation

HINT:

- DTC C0210/33 and C1238/38 relate to the skid control sensor RH.
- DTC C0215/34 and C1239/39 relate to the skid control sensor LH.

WIRING DIAGRAM**BC****INSPECTION PROCEDURE****NOTICE:**

Check the speed sensor signal in test mode after cleaning or replacement (see page [BC-28](#)).

1**CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**

- (a) Using the DATA LIST of the intelligent tester, check for any momentary interruption in the wire harness corresponding to a DTC (see page [BC-23](#)).

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
RR SPD OPN Open	RR speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
RL SPD OPN	RL speed sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-

OK:

There are no momentary interruptions.

HINT:

Perform this inspection before removing the sensor and connector.

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

2 READ VALUE OF INTELLIGENT TESTER (REAR SPEED SENSOR)

- (a) Check the DATA LIST for proper functioning of the rear speed sensor.

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
RR WHEEL SPD	Wheel speed sensor (RR) reading : min.: 0 km/h (0 mph), max.: 326 km/h (202.8 mph)	Similar to speed indicated on speedometer	-
RL WHEEL SPD	Wheel speed sensor (RL) reading : min.: 0 km/h (0 mph), max.: 326 km/h (202.8 mph)	Similar to speed indicated on speedometer	-

BC

OK:

There is almost no difference between actual wheel speed and displayed speed value.

HINT:

There is a tolerance of +-10% in the speedometer indication.

NG

Go to step 5

OK

3 PERFORM TEST MODE INSPECTION (SIGNAL CHECK)

- (a) Perform a TEST MODE inspection and check for DTCs (see page [BC-28](#)).

OK:

No DTCs output.

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

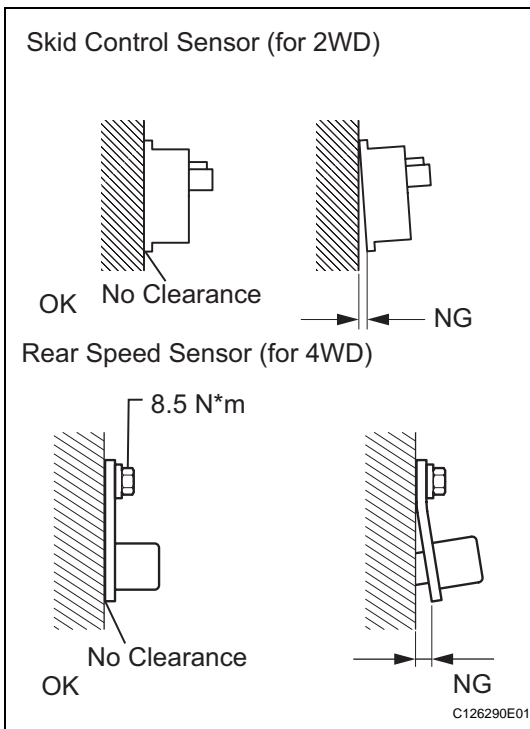
4 RECONFIRM DTC

- (a) Clear the DTC(s) (see page [BC-47](#)).
 (b) Start the engine.
 (c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.

- (d) Check if the same DTC(s) is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**Go to step 11****A****END****5****INSPECT SKID CONTROL SENSOR OR REAR SPEED SENSOR (INSTALLATION)**

- (a) Check the speed sensor installation.

OK:**for 2WD**

There is no clearance between the sensor and rear axle carrier.

for 4WD

The installation bolt is tightened properly and there is no clearance between the sensor and rear axle carrier.

Torque: 8.5 N*m (87 kgf*cm, 75 in.*lbf)

HINT:

Check the speed sensor signal after the replacement (see page [BC-28](#)).

NG**CHECK AND REPLACE SKID CONTROL SENSOR OR REAR SPEED SENSOR****OK****6****CHECK SKID CONTROL SENSOR OR REAR SPEED SENSOR (TIP)**

- (a) Remove the skid control sensor (for 2WD) or rear speed sensor (for 4WD).

- (b) Check the sensor tip.

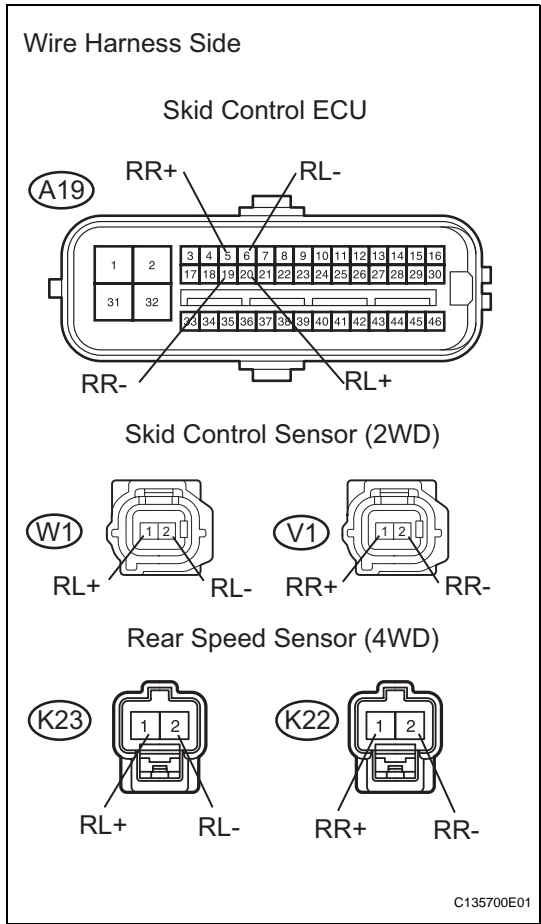
OK:

No scratches or foreign matter on the sensor tip.

NG**CLEAR OR REPLACE SKID CONTROL SENSOR OR REAR SPEED SENSOR****OK****BC**

7

CHECK WIRE HARNESS (SKID CONTROL ECU - REAR SPEED SENSOR)



- (a) Disconnect the A19 ECU connector.
- (b) Disconnect W1 and V1 sensor connectors for 2WD. Disconnect K23 and K22 sensor connectors for 4WD.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance:
for 2WD (LH Side)

Tester Connection	Specified Condition
A19-20 (RL+) - W1-1 (RL+)	Below 1 Ω
A19-6 (RL-) - W1-2 (RL-)	Below 1 Ω
A19-20 (RL+) - Body ground	10 kΩ or higher
A19-6 (RL-) - Body ground	10 kΩ or higher

for 2WD (RH Side)

Tester Connection	Specified Condition
A19-5 (RR+) - V1-1 (RR+)	Below 1 Ω
A19-19 (RR-) - V1-2 (RR-)	Below 1 Ω
A19-5 (RR+) - Body ground	10 kΩ or higher
A19-19 (RR-) - Body ground	10 kΩ or higher

for 4WD (LH Side)

Tester Connection	Specified Condition
A19-20 (RL+) - K23-1 (RL+)	Below 1 Ω
A19-6 (RL-) - K23-2 (RL-)	Below 1 Ω
A19-20 (RL+) - Body ground	10 kΩ or higher
A19-6 (RL-) - Body ground	10 kΩ or higher

for 4WD (RH Side)

Tester Connection	Specified Condition
A19-5 (RR+) - K22-1 (RR+)	Below 1 Ω
A19-19 (RR-) - K22-2 (RR-)	Below 1 Ω
A19-5 (RR+) - Body ground	10 kΩ or higher
A19-19 (RR-) - Body ground	10 kΩ or higher

NG

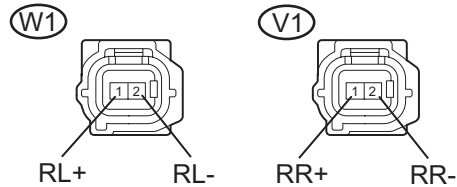
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

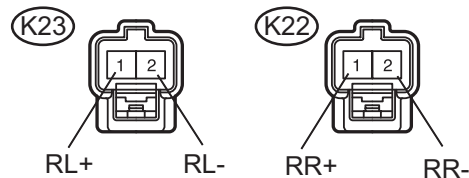
8 CHECK SKID CONTROL ECU (SENSOR INPUT VOLTAGE)

Wire Harness Side

Skid Control Sensor (2WD)



Rear Speed Sensor (4WD)



C135699E01

- (a) Disconnect the W1 and V1 sensor connectors for 2WD. Disconnect the K23 and K22 sensor connectors for 4WD.

- (b) Measure the voltage of the wire harness side connectors.

Standard voltage:
for 2WD

Tester Connection	Condition	Specified Condition
W1-1 (RL+) - Body ground	Ignition switch ON	5.7 to 17.3 V
V1-1 (RR+) - Body ground	Ignition switch ON	5.7 to 17.3 V

for 4WD

Tester Connection	Condition	Specified Condition
K23-1 (RL+) - Body ground	Ignition switch ON	5.7 to 17.3 V
K22-1 (RR+) - Body ground	Ignition switch ON	5.7 to 17.3 V

NG

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

OK

9 RECONFIRM DTC

- (a) Clear the DTC(s) (see page [BC-47](#)).
 (b) Start the engine.
 (c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
 (d) Check if the same DTC(s) is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B

END

A

10 REPLACE SKID CONTROL SENSOR OR REAR SPEED SENSOR

- (a) Replace the skid control sensor (2WD) or rear speed sensor (4WD).

NEXT

BC

11

RECONFIRM DTC

- (a) Clear the DTC(s) (see page BC-47).
- (b) Start the engine.
- (c) Drive the vehicle at a speed of 20 km/h (12 mph) or more for at least 60 seconds.
- (d) Check if the same DTC(s) is output (see page BC-47).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B



REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

DTC	C0226/21	SFR Solenoid Circuit
DTC	C0236/22	SFL Solenoid Circuit
DTC	C0246/23	SRR Solenoid Circuit
DTC	C0256/24	SRL Solenoid Circuit
DTC	C1225/25	SM Solenoid Circuit

DESCRIPTION

This solenoid is turned on in accordance with signals from the skid control ECU and controls the pressure on the wheel cylinders to control the braking force.

The solenoid and solenoid relay are built into the ABS and TRACTION actuator.

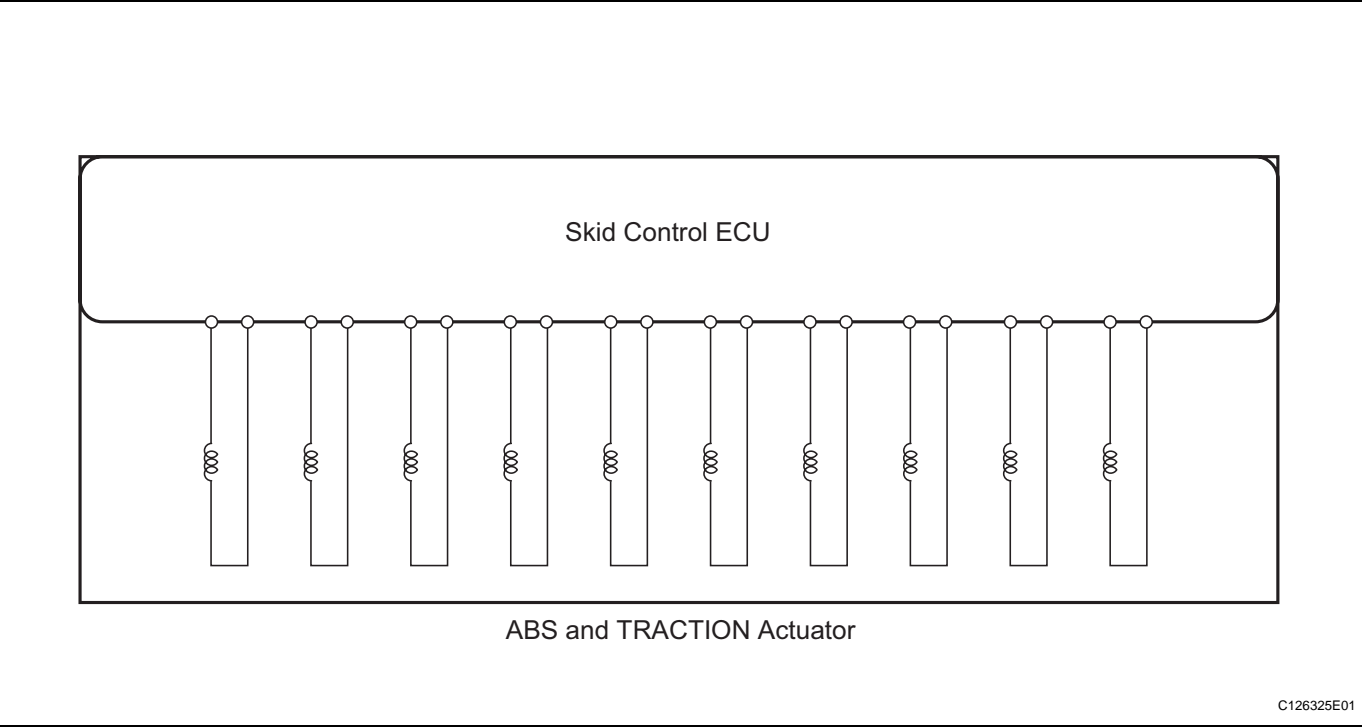
DTC No.	DTC Detection Condition	Trouble Area
C0226/21 C0236/22 C0246/23 C0256/24	Open or short in solenoid circuit continues for 0.05 seconds or more.	ABS and TRACTION actuator
C1225/25	When one of following conditions is met: 1. During switching solenoid (SM1 or SM2) ON signal input, overcurrent continues for 0.05 seconds or more. 2. During switching solenoid (SM1 or SM2) OFF signal input, open circuit continues for 0.05 seconds or more. 3. During switching solenoid (SM1 or SM2) OFF signal input, current continues to be applied for 0.1 second or more. 4. Short to GND in switching solenoid (SM1 or SM2) continues for 0.1 second or more. 5. Switching solenoids SM1 and SM2 are shorted for 0.1 second or more. 6. Switch solenoids (SM1 or SM2) ON signal output occurs for 0.1 seconds or more.	ABS and TRACTION actuator

HINT:

DTCs C0226/21, C0236/22, C0246/23, C0256/24 and C1225/25:

The skid control ECU begins to detect these DTCs when the vehicle speed exceeds 6 km/h (4 mph).

WIRING DIAGRAM



INSPECTION PROCEDURE

1

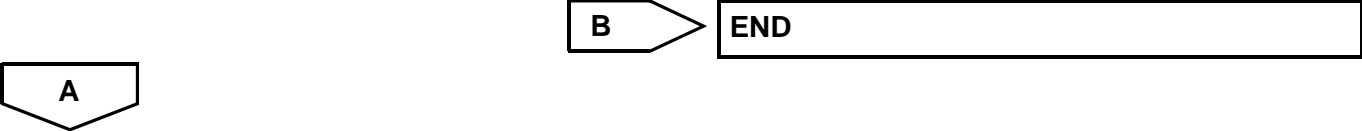
RECONFIRM DTC

- (a) Clear the DTC(s) (see page [BC-47](#)).
- (b) Start the engine.
- (c) Drive the vehicle at 6 km/h (4 mph) or more to activate the initial check.
- (d) Check if the same DTC(s) is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

HINT:
The DTCs may be stored due to a malfunction in the connector terminal.



REPLACE ABS AND TRACTION ACTUATOR

DTC	C0273/13	Open in ABS Motor Relay Circuit
DTC	C0274/14	Short to B+ in ABS Motor Relay Circuit
DTC	C1361/91	Short Circuit in ABS Motor Fail Safe Relay Circuit

DESCRIPTION

If a DTC related to the motor line is stored, the VSC FAIL (fail-safe) relay cuts off the power supply to the VSC MTR relay and performs the fail-safe operation.

While the ABS, TRC, VSC, or BA is operating, the skid control ECU turns the VSC FAIL relay on and activates the pump motor in the ABS and TRACTION actuator.

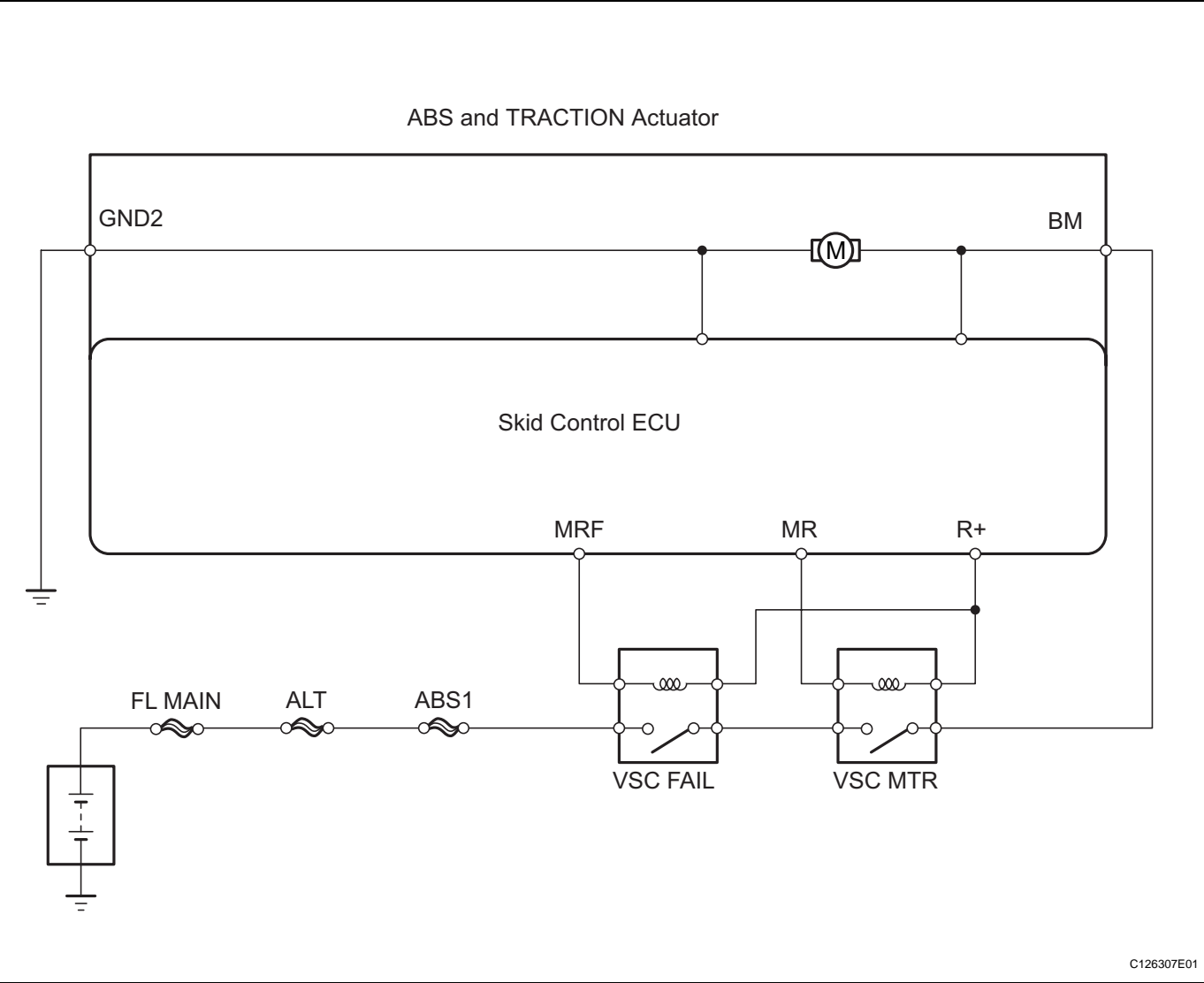
These DTCs may be stored if the motor relay (+BM) voltage becomes lower than the DTC detecting condition due to insufficient output from the battery or alternator.

DTC No.	DTC Detection Condition	Trouble Area
C0273/13	When either condition below is met: 1. All of following conditions continue for 0.12 seconds or more. (a) IG1 terminal voltage between 9.5 V and 17.2 V. (b) During initial check or ABS/TRC/VSC/BA. (c) Relay contact open when relay on. 2. Both of following conditions continue for 0.12 seconds or more. (a) IG1 terminal voltage 9.5 V or less. (b) Relay contact remains open when relay on.	<ul style="list-style-type: none"> • ABS1 H-fuse • VSC MTR relay • VSC MTR relay circuit • VSC FAIL relay • VSC FAIL relay circuit • ABS and TRACTION actuator
C0274/14	Despite motor relay (VSC MTR relay) off, motor relay remains closed for 4 seconds or more.	<ul style="list-style-type: none"> • ABS1 H-fuse • VSC MTR relay • VSC MTR relay circuit • VSC FAIL relay • VSC FAIL relay circuit • ABS and TRACTION actuator
C1361/91	Immediately after ignition switch ON, motor fail-safe relay (VSC FAIL relay) contact closed for 4 seconds when motor fail-safe relay (VSC FAIL relay) off.	<ul style="list-style-type: none"> • ABS1 H-fuse • VSC MTR relay • VSC MTR relay circuit • VSC FAIL relay • VSC FAIL relay circuit • ABS and TRACTION actuator

HINT:

DTCs C0273/13, C0274/14 and C1361/91: The skid control ECU begins to detect these DTCs when the vehicle speed exceeds 6 km/h (4 mph).

WIRING DIAGRAM



INSPECTION PROCEDURE

1

PERFORM ACTIVE TEST BY INTELLIGENT TESTER (MOTOR RELAY)

- (a) Select the ACTIVE TEST, generate a control command, and then check that the ABS motor relay operates.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
MOTOR RELAY	Turns ABS motor relay ON / OFF	Operating sound of motor can be heard

OK:
The operation sound of the ABS motor can be heard.

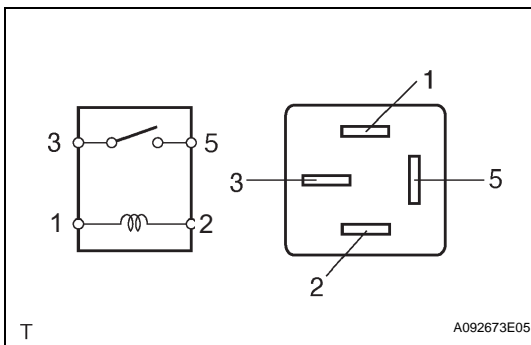
OK

Go to step 8

NG

2 INSPECT FUSE (ABS1)

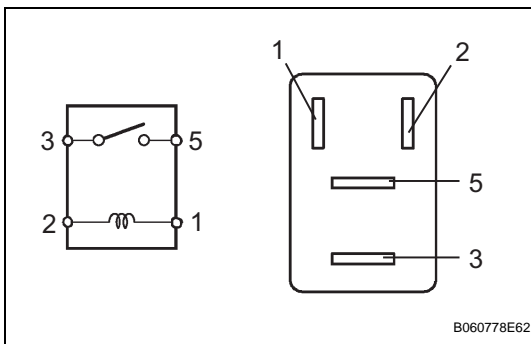
- Remove the ABS1 H-fuse from the engine room No. 1 relay block.
- Measure the resistance of the fuse.

Standard resistance:**Below 1 Ω** **NG****REPLACE FUSE****OK****3 INSPECT VSC MOTOR RELAY (Marking: VSC MTR)**

- Remove the VSC motor relay from the engine room No. 1 relay block.
- Measure the resistance of the relay.

Standard resistance

Tester Connection	Specified Condition
3 - 5	10 k Ω or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG**REPLACE VSC MOTOR RELAY****OK****4 INSPECT FAIL-SAFE RELAY (Marking: VSC FAIL)**

- Remove the fail-safe relay from the engine room No. 1 relay block.
- Measure the resistance of the relay.

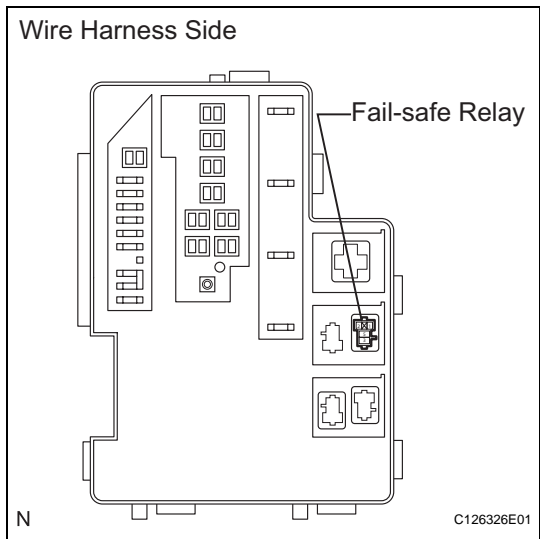
Standard resistance

Tester Connection	Specified Condition
3 - 5	10 k Ω or higher
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG**REPLACE FAIL-SAFE RELAY****OK****BC**

5

CHECK WIRE HARNESS (FAIL-SAFE RELAY - BATTERY)



- (a) Remove the fail-safe relay from the engine room No. 1 relay block.
- (b) Measure the voltage of the wire harness side connector.
- Standard voltage**

Tester Connection	Specified Condition
VSC FAIL relay terminal 5 - Body ground	10 to 14 V

NG

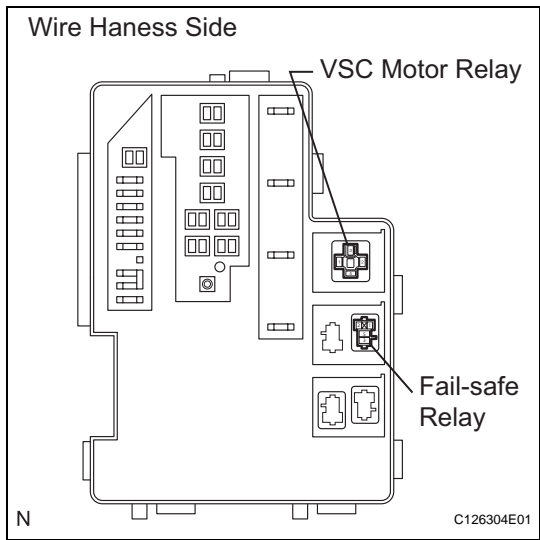
REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

BC

6

CHECK ENGINE ROOM NO. 1 RELAY BLOCK (FAIL-SAFE RELAY - VSC MOTOR RELAY AND BODY GROUND)



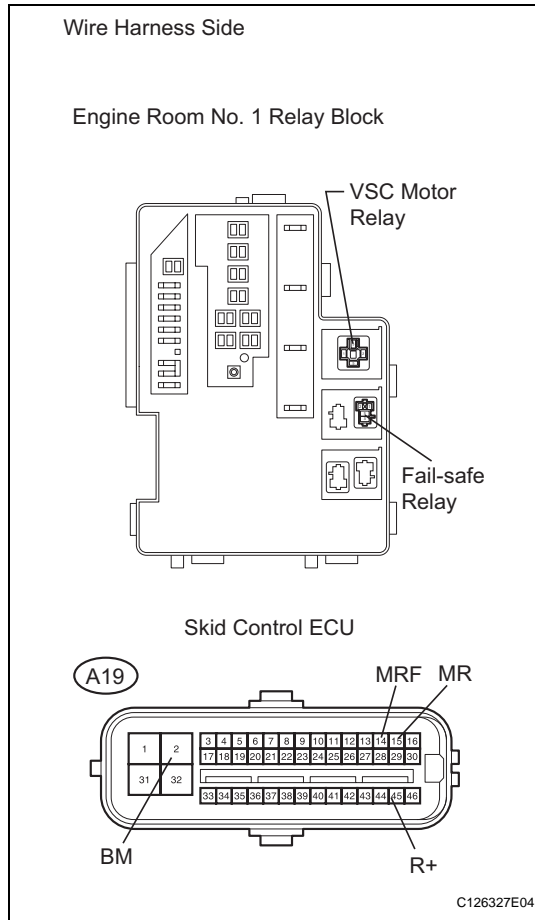
- (a) Remove the fail-safe and VSC motor relays from the engine room No. 1 relay block.
- (b) Measure the resistance of the relay terminals.
- Standard resistance**

Tester Connection	Specified Condition
VSC FAIL relay terminal 3 - VSC MTR relay terminal 5	Below 1 Ω
VSC FAIL relay terminal 3 - Body ground	10 k Ω or higher

NG

REPLACE ENGINE ROOM NO. 1 RELAY BLOCK

OK

7**CHECK WIRE HARNESS (ENGINE ROOM NO. 1 RELAY BLOCK - SKID CONTROL ECU)**

- Disconnect the A19 ECU connector.
- Remove the fail-safe and VSC motor relays from the engine room No. 1 relay block.
- Measure the resistance of the wire harness connectors.

Standard resistance

Tester Connection	Specified Condition
A19-2 (BM) - VSC MTR relay terminal 3	Below 1 Ω
A19-14 (MRF) - VSC FAIL relay terminal 2	Below 1 Ω
A19-15 (MR) - VSC MTR relay terminal 2	Below 1 Ω
A19-45 (R+) - VSC FAIL relay terminal 1	Below 1 Ω
A19-2 (BM) - Body ground	10 k Ω or higher
A19-14 (MRF) - Body ground	10 k Ω or higher
A19-15 (MR) - Body ground	10 k Ω or higher
A19-45 (R+) - Body ground	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****8****RECONFIRM DTC**

- Clear the DTC(s) (see page BC-47).
- Start the engine.
- Drive the vehicle at 6 km/h (4 mph) or more to activate the initial check.
- Check if the same DTC(s) is output (see page BC-47).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**END****A****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**

DTC	C0278/11	Open in ABS Solenoid Relay Circuit
DTC	C0279/12	Short to B+ in ABS Solenoid Relay Circuit

DESCRIPTION

The solenoid relay supplies power to the ABS solenoid and TRC solenoid.

After the ignition switch is turned ON, the vehicle speed has reached 6 km/h (4 mph) and the solenoid is determined to be normal by the initial check self-diagnosis, the relay switches on. If any open or short circuits are detected, the relay switches off.

These DTCs may be set if the voltage supply to the solenoid relay (+BS) falls below the DTC detection threshold due to the battery or alternator outputs being insufficient.

DTC No.	DTC Detection Condition	Trouble Area
C0278/11	When either condition below is met: 1. Both of following conditions continue for 0.2 seconds or more. (a) IG1 terminal voltage between 9.5 V and 17.2 V. (b) Solenoid relay contact open when relay on. 2. Both of following conditions continue for 0.2 seconds or more. (a) IG1 terminal voltage becomes lower than 9.5 V when relay turned on. (b) Relay contact remains open.	<ul style="list-style-type: none"> • ABS2 H-fuse • Wire harness (+BS circuit) • ABS and TRACTION actuator
C0279/12	Immediately after ignition switch turned ON, solenoid relay contact closed for 0.2 seconds or more when relay off.	<ul style="list-style-type: none"> • ABS2 H-fuse • Wire harness (+BS circuit) • ABS and TRACTION actuator

HINT:

DTCs C0278/11 and C0279/12: The skid control ECU begins to detect these DTCs when the vehicle speed exceeds 6 km/h (4 mph).

WIRING DIAGRAM

Refer to DTC C0273/13, C0274/14, C1361/91 (see page [BC-79](#)).

INSPECTION PROCEDURE

1	INSPECT FUSES (ABS2)
----------	-----------------------------

- Remove the ABS2 H-fuse from the engine room No. 1 relay block.
- Measure the resistance of the fuse.

Standard resistance:

Below 1 Ω

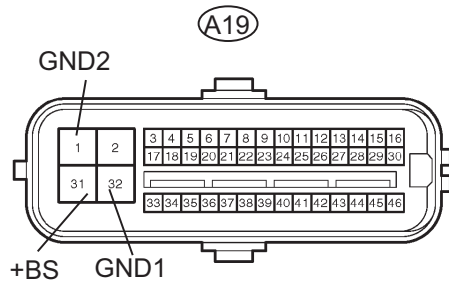
NG

REPLACE FUSE

OK

2**CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)**

Wire Harness Side



C121700E39

- (a) Disconnect the A19 ECU connector.
- (b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Specified Condition
A19-31 (+BS) - Body ground	10 to 14 V

- (c) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
A19-32 (GND1) - Body ground	Below 1 Ω
A19-1 (GND2) - Body ground	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****3****RECONFIRM DTC**

- (a) Clear the DTCs (see page [BC-47](#)).
- (b) Start the engine.
- (c) Drive the vehicle at 6 km/h (4 mph) or more to activate the initial check.
- (d) Check if the same DTCs is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**END****A****BC****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**

DTC**C1201/51****Engine Control System Malfunction****DESCRIPTION**

If a malfunction in the engine control system is detected, the operations of VSC and TRC are prohibited by the fail-safe function. When the signals from the engine are input normally, the fail-safe is canceled and the DTC is not stored.

DTC No.	DTC Detection Condition	Trouble Area
C1201/51	Engine control system malfunction signal continues for 5 seconds.	Engine control system

INSPECTION PROCEDURE**1****CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)**

- (a) Using the DATA LIST of the intelligent tester, check for any momentary interruption in the wire harness corresponding to the DTC (see page [BC-23](#)).

Skid control ECU

Item	Measurement Item / Range (Display)	Normal Condition
EFI COM OPN	EFI communication open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal

OK:**There are no momentary interruptions.****HINT:**

Perform the above inspection before removing the sensor and connector.

NG**Go to step 3****OK****2****CHECK DTC FOR ENGINE CONTROL SYSTEM**

- (a) Clear the DTC (engine control system).
(b) Check the DTC (engine control system).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**REPLACE ECM****A****REPAIR ENGINE CONTROL SYSTEM**

3 REPAIR OR REPLACE HARNESS AND CONNECTOR (ECM - SKID CONTROL ECU)**NEXT****4 RECONFIRM DTC**

- (a) Clear the DTC (see page [BC-47](#)).
- (b) Perform a road test.
- (c) Check if the same DTC is recorded (see page [BC-47](#)).

Result

Result	Proceed to
DTC is not output	A
DTC C1201/51 is output	B

B**Go to step 2****A****END****BC**

DTC	C1203/53	ECM Communication Circuit Malfunction
-----	----------	---------------------------------------

DESCRIPTION

The circuit is used to send TRC and VSC control information from the skid control ECU to the ECM, and engine control information from the ECM to the skid control ECU.

DTC No.	DTC Detection Condition	Trouble Area
C1203/53	Information relating to engine, drive source or destination stored in ECM does not match information stored in skid control ECU.	ECM

INSPECTION PROCEDURE

HINT:
Check that the part numbers of the installed ECM and skid control ECU are correct before performing the following procedure.

1	RECONFIRM DTC
---	---------------

- (a) Clear the DTC (see page BC-47).
- (b) Start the engine.
- (c) Check if the same DTC is output (see page BC-47).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B



REPLACE ECM

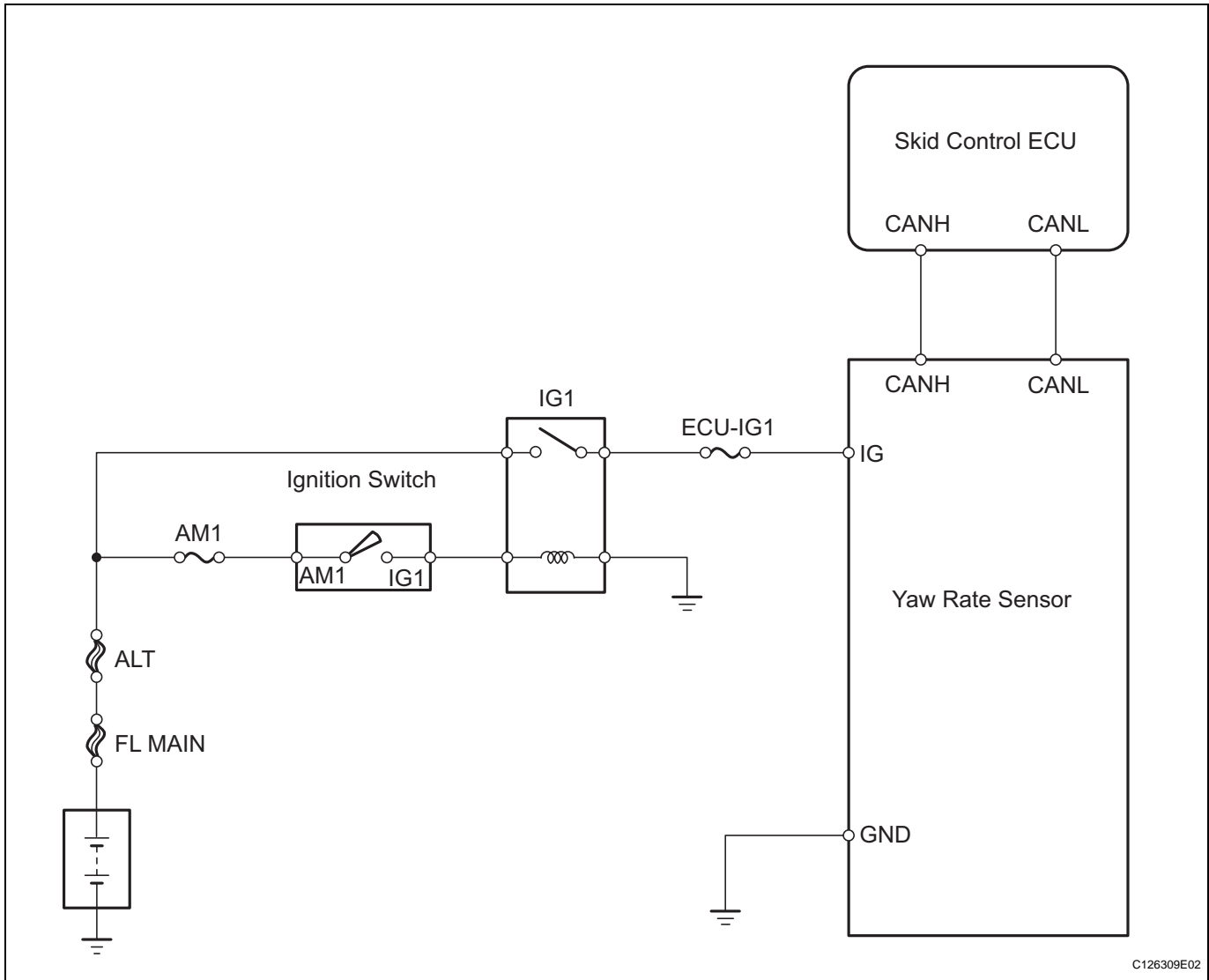
DTC	C1210/36	Zero Point Calibration of Yaw Rate Sensor Undone
DTC	C1336/39	Zero Point Calibration of Acceleration Sensor Undone

DESCRIPTION

The ABS and TRACTION actuator (Skid control ECU) receives signals from the yaw rate and deceleration sensor via the CAN communication system. The yaw rate sensor has a built-in deceleration sensor and detects the vehicle's condition using 2 circuits (GL1, GL2). If there are problems in the bus lines between the yaw rate and deceleration sensor and the CAN communication system, DTCs U0123/62 (yaw rate sensor communication trouble) and U0124/95 (deceleration sensor communication trouble) are output. The DTCs are also output when the calibration has not been completed.

DTC No.	DTC Detection Condition	Trouble Area
C1210/36	Zero point calibration of yaw rate sensor not completed	<ul style="list-style-type: none"> • ABS and TRACTION actuator (skid control ECU) • Zero point calibration incomplete • Yaw rate sensor
C1336/39	When either condition below is met: <ul style="list-style-type: none"> • Vehicle driven without completion of zero point calibration • After zero point has been obtained, zero point voltage of sensor not between 2.38 V and 2.62 V 	<ul style="list-style-type: none"> • ABS and TRACTION actuator (skid control ECU) • Zero point calibration incomplete • Yaw rate sensor

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page [BC-24](#)).

HINT:

When DTC U0123/62, U0124/95 or U0126/63 is output together with DTC C1210/36 or C1336/39, inspect and repair trouble areas indicated by DTC U0123/62, U0124/95 or U0126/63 first.

1

CHECK YAW RATE SENSOR INSTALLATION

- (a) Check that the yaw rate sensor has been installed properly (see page [BC-211](#)).

OK:

The sensor is tightened to the specified torque.
The sensor is not tilted.

NG

INSTALL YAW RATE SENSOR CORRECTLY

OK

2

PERFORM ZERO POINT CALIBRATION OF YAW RATE SENSOR

- (a) Perform zero point calibration of the yaw rate and deceleration sensor (see page [BC-24](#)).

NEXT

3

RECONFIRM DTC

- (a) Clear the DTC(s) (see page [BC-47](#)).
(b) Start the engine.
(c) Drive the vehicle and turn the steering wheel to the right and left at a speed of 45 km/h (28 mph) or more.
(d) Check if the same DTC(s) is recorded (See page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

BC

HINT:

- The DTC(s) is set if the zero point calibration has not been completed successfully.
- End the procedure when the same DTC(s) is not set after completion of the zero point calibration.

B

END

A

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

DTC	C1223/43	ABS Control System Malfunction
-----	----------	--------------------------------

DESCRIPTION

This DTC is output when the VSC system detects a malfunction in the ABS system.

DTC No.	DTC Detecting Condition	Trouble Area
C1223/43	Malfunction in ABS control system	Skid control ECU

INSPECTION PROCEDURE

1	CHECK DTC FOR ABS SYSTEM
---	--------------------------

- (a) Clear the DTC (see page BC-47).
- (b) Turn the ignition switch ON.
- (c) Check if the same DTC is recorded (see page BC-47).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

BC

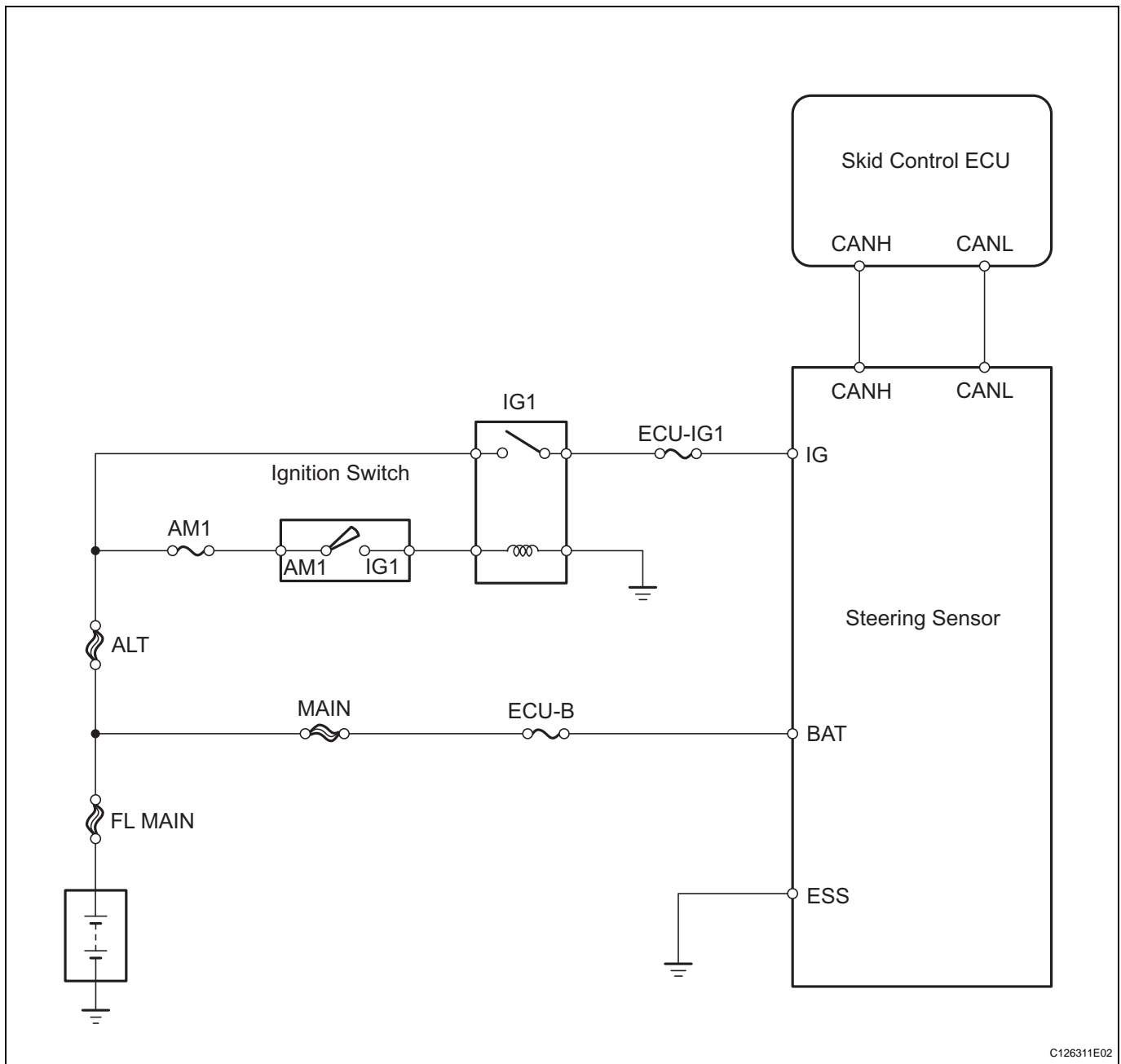


REPAIR CIRCUIT INDICATED BY OUTPUT DTC
--

DTC**C1231/31****Steering Angle Sensor Circuit Malfunction****DESCRIPTION**

The steering sensor signal is sent to the skid control ECU via the CAN communication system. When there is a malfunction in the CAN communication system, it is detected by the steering sensor zero point malfunction diagnostic function.

DTC No.	DTC Detection Condition	Trouble Area
C1231/31	When IG1 terminal voltage 9.5 V or more, steering angle sensor malfunction signal received.	<ul style="list-style-type: none"> Steering sensor Steering sensor circuit Steering sensor power supply CAN communication system

WIRING DIAGRAM

INSPECTION PROCEDURE

HINT:

- When U0073/94, U0123/62, U0124/95 or U0126/63 is output together with C1231/31, inspect and repair the trouble areas indicated by U0073/94, U0123/62, U0124/95 or U0126/63 first.
- When there are problems with the speed sensor or the yaw rate sensor, DTCs for the steering sensor may be output even when the steering sensor is normal. When DTCs for the speed sensor or yaw rate sensor are output together with other DTCs for the steering sensor, inspect and repair the speed sensor and yaw rate sensor first, and then inspect and repair the steering sensor.

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

- (a) Using the DATA LIST of the intelligent tester, check for any momentary interruptions in the wire harness and connectors between the skid control ECU and the steering sensor (see page [BC-23](#)).

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
STEERING OPN	Steering angle sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-

OK:

There are no momentary interruptions.

HINT:

Perform the above inspection before removing the sensor and connector.

NG

Go to step 4

OK

2 CHECK DTC

- (a) Clear the DTC (see page [BC-47](#)).
 (b) Turn the ignition switch OFF.
 (c) Turn the ignition switch ON again and check that no CAN communication system DTC is output.
 (d) Drive the vehicle and turn the steering wheel to the right and left at a speed of 35 km/h (24 mph) and check that no speed and yaw rate sensor DTCs are output.

Result

Result	Proceed to
DTC is not output	A
CAN communication system DTC is output	B
Speed sensor or yaw rate sensor DTC is output	C

B

CHECK CAN COMMUNICATION SYSTEM

C

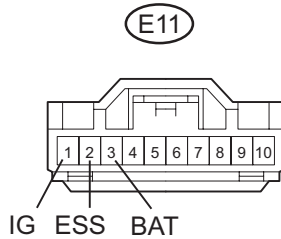
REPAIR CIRCUIT INDICATED BY OUTPUT DTC

A

3

CHECK WIRE HARNESS (STEERING SENSOR - BATTERY AND BODY GROUND)

Wire Harness Side



- (a) Remove the steering wheel assembly and the column cover.
- (b) Disconnect the E11 sensor connector.
- (c) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
E11-1(IG) - Body ground	Ignition switch ON	10 to 14 V
E11-3 (BAT) - Body ground	Always	10 to 14 V

- (d) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
E11-2 (ESS) - Body ground	Below 1Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

BC

OK

REPLACE STEERING SENSOR

4

REPAIR OR REPLACE HARNESS AND CONNECTOR (STEERING SENSOR TO SKID CONTROL ECU)

NEXT

5

RECONFIRM DTC

- (a) Clear the DTC (see page [BC-47](#)).
- (b) Start the engine.
- (c) Drive the vehicle and turn the steering wheel to the right and left at a speed of 45 km/h (28 mph) or more for several seconds.
- (d) Check if the same DTC is recorded (see page [BC-47](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

Go to step 2

A

END

DTC	C1232/32	Stuck in Deceleration Sensor
DTC	C0371/71	Yaw Rate Sensor (Test Mode DTC)
DTC	C1234/34	Yaw Rate Sensor Malfunction
DTC	C1243/43	Acceleration Sensor Stuck Malfunction
DTC	C1244/44	Open or Short in Deceleration Sensor Circuit
DTC	C1245/45	Acceleration Sensor Output Malfunction
DTC	C1279/79	Deceleration Sensor Output Voltage Malfunction (Test Mode DTC)
DTC	C1381/97	Yaw Rate and / or Acceleration Sensor Power Supply Voltage Malfunction

BC

DESCRIPTION

The skid control ECU receives signals from the yaw rate and deceleration sensor via the CAN communication system.

The yaw rate sensor has a built-in deceleration sensor and detects the vehicle's condition using 2 circuits (GL1: G sensor 1, GL2: G sensor 2).

If there is trouble in the bus lines between the yaw rate and deceleration sensor and the CAN communication system, DTC U0123/62 (malfunction in CAN communication with the yaw rate sensor) and U0124/95 (malfunction in CAN communication with the deceleration sensor) are output.

These DTCs are also output when the calibration has not been completed.

DTCs C0371/71 and C1279/79 are deleted when the yaw rate and deceleration sensor sends a yaw rate and/or deceleration signal or test mode ends. DTCs C0371/71 and C1279/79 are output only in test mode.

DTC No.	DTC Detection Condition	Trouble Area
C1232/32	At vehicle speed of 10 km/h (6 mph) or more, either GL1 or GL2 (input signal) does not change for 30 seconds or more.	<ul style="list-style-type: none"> Yaw rate sensor Yaw rate sensor circuit
C0371/71	Detected only during test mode	<ul style="list-style-type: none"> Yaw rate sensor Yaw rate sensor circuit
C1234/34	Sensor malfunction signal received from yaw rate sensor.	<ul style="list-style-type: none"> Yaw rate sensor Yaw rate sensor circuit
C1243/43	While vehicle speed changes from 30 km/h (19 mph) to 0 km/h (0 mph), condition that values of GL1 and GL2 do not change occurs 16 times or more.	<ul style="list-style-type: none"> Yaw rate sensor Yaw rate sensor circuit
C1244/44	When either condition below is met: 1. IG terminal voltage is 9.5 V to 17.2 V and YD1 malfunction signal from yaw rate sensor is received. 2. After difference between GL1 and GL2 becomes 0.6 G or more with vehicle stationary, difference remains 0.4 G or more for 60 seconds or more.	<ul style="list-style-type: none"> Yaw rate sensor Yaw rate sensor circuit

DTC No.	DTC Detection Condition	Trouble Area
C1245/45	At vehicle speed of 30 km/h (19 mph) or more, difference between forward and backward G calculated from deceleration sensor value and that calculated from vehicle speed sensor value exceeds 0.35 G for 60 seconds or more.	<ul style="list-style-type: none"> Yaw rate sensor Yaw rate sensor circuit
C1279/79	Detected only during test mode.	<ul style="list-style-type: none"> Yaw rate sensor Yaw rate sensor circuit
C1381/97	At vehicle speed of more than 3 km/h (2 mph), deceleration sensor power source malfunction signal received for 10 seconds or more.	<ul style="list-style-type: none"> Yaw rate sensor Yaw rate sensor circuit

WIRING DIAGRAM

Refer to DTC C1210/23, C1336/39 (see page [BC-89](#)).

INSPECTION PROCEDURE

NOTICE:

When replacing yaw rate and deceleration sensor, perform zero point calibration (see page [BC-24](#)).

HINT:

When DTC U0123/62, U0124/95 or U0126/63 is output together with DTC C1232/32, C1234/34, C1243/43, C1244/44, C1245/45, or C1387/97, inspect and repair the trouble areas indicated by DTC U0123/62, U0124/95 or U0126/63 first.

BC

1	CHECK DTC
----------	------------------

- (a) Clear the DTC (see page [BC-47](#)).
- (b) Turn the ignition switch OFF.
- (c) Turn the ignition switch ON again and check that no CAN communication system DTC(s) is output.
- (d) Drive the vehicle at a speed of 30 km/h (19 mph) or more and check that no DTCs are output.

Result

Result	Proceed to
DTC is output (relating to yaw rate and deceleration sensor)	A
DTC is output (relating to CAN communication system)	B
DTC is not output	C

B

REPAIR CAN COMMUNICATION SYSTEM

C

END

A

2	CHECK YAW RATE SENSOR INSTALLATION
----------	---

- (a) Check that the yaw rate sensor has been installed correctly (see page [BC-211](#)).

OK:

The sensor is tightened to the specified torque.
The sensor is not tilted.

NG

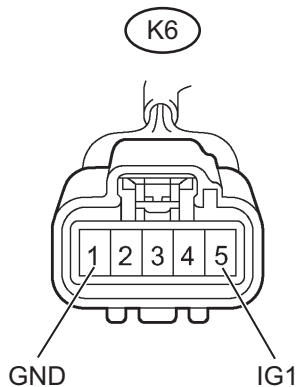
INSTALL YAW RATE SENSOR CORRECTLY

OK

3

CHECK WIRE HARNESS (YAW RATE SENSOR - BATTERY AND BODY GROUND)

Wire Harness Side



C121701E02

- (a) Disconnect the K6 sensor connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
K6-5 (IG) - Body ground	Ignition switch ON	10 to 14 V

- (c) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
K6-1 (GND) - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE YAW RATE SENSOR

BC

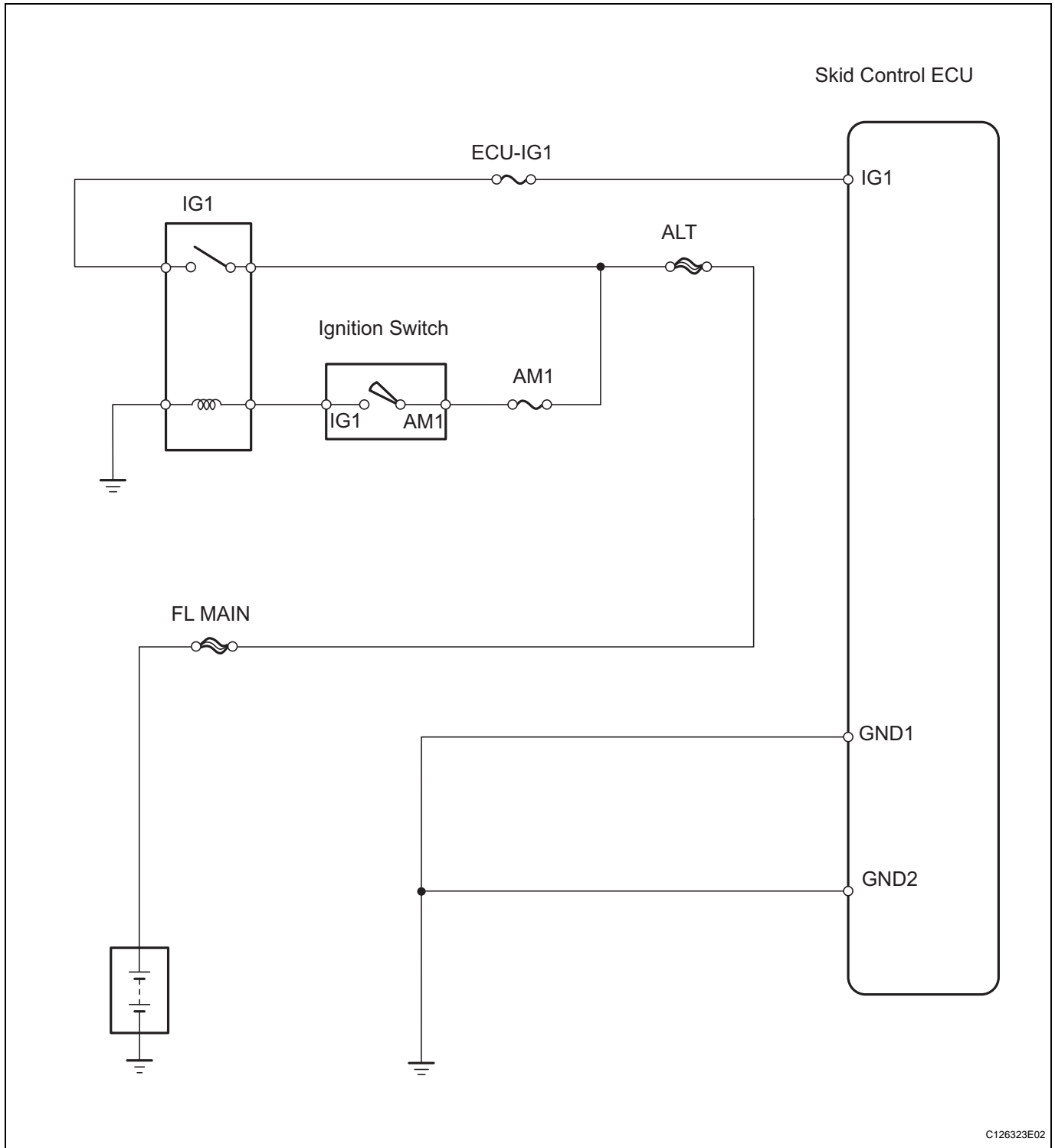
DTC**C1241/41****Low Battery Positive Voltage****DESCRIPTION**

When there is an abnormality in the power supply circuit of the brake actuator (skid control ECU), the skid control ECU sets a DTC and the operation is prohibited by the fail-safe function. This DTC is set when the voltage supplied to terminal IG1 is outside the DTC detection threshold, due to abnormalities of the battery, power source circuits or charging circuits such as the alternator circuit.

The fail-safe function is canceled when the voltage to terminal IG1 returns to normal.

DTC No.	DTC Detection Condition	Trouble Area
C1241/41	When one of following conditions is met: 1. At vehicle speed of 3 km/h (2 mph) or more, IG1 terminal voltage 9.5 V or less for 10 seconds or more. 2. When solenoid relay remains ON and IG1 terminal voltage 9.5 V or less, relay contact open for 0.2 seconds or more. 3. When motor relay terminals ON and IG terminal voltage 9.5 V or less, actuator pump activation motor OFF status continues for 0.1 seconds or more. 4. When IG1 terminal voltage 9.5 V or less, vehicle speed sensor power supply decreases for 60 seconds or more.	<ul style="list-style-type: none"> • Battery • Charging system • Power source circuit • Internal power supply circuit of skid control ECU

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 INSPECT FUSE (ECU-IG1)

- Remove the ECU-IG1 fuse from the instrument panel junction block.
- Measure the resistance of the fuse.

Standard resistance:
Below 1 Ω

NG

REPLACE FUSE

OK

2

INSPECT BATTERY

(a) Check the battery voltage.

Standard voltage:
11 to 14 V

NG

CHECK CHARGING SYSTEM

OK

3

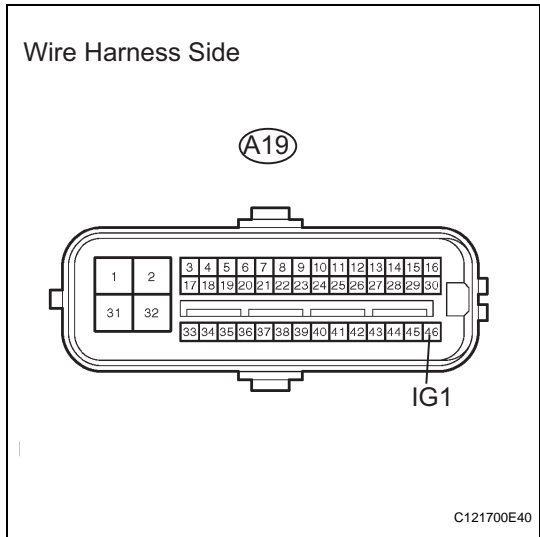
CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)

- (a) Disconnect the A19 ECU connector.
(b) Measure the voltage of the wire harness side connector.
Standard voltage

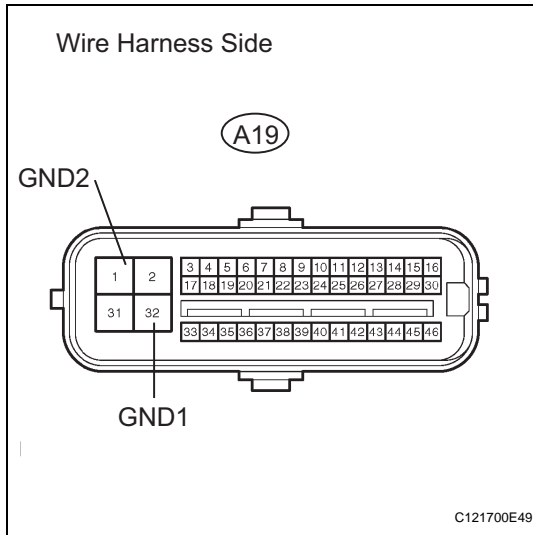
Tester Connection	Condition	Specified Condition
A19-46 (IG1) - Body ground	Ignition switch ON	10 to 14 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR



OK

4 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)

- (a) Disconnect the A19 ECU connector.
- (b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
A19-32 (GND1) - Body ground	Below 1 Ω
A19-1 (GND2) - Body ground	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****5 RECONFIRM DTC**

- (a) Clear the DTC (see page [BC-47](#)).
- (b) Drive the vehicle at 3 km/h (2 mph) or more for several seconds.
- (c) Check if the same DTC is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**END****A****BC****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**

DTC	C1246/46	Master Cylinder Pressure Sensor Malfunction
DTC	C1281/81	Master Cylinder Pressure Sensor Output Malfunction (Test Mode DTC)

DESCRIPTION

The master cylinder pressure sensor is connected to the skid control ECU in the ABS and TRACTION actuator.

DTC C1281/81 can be detected when the master cylinder pressure sensor sends a master cylinder pressure signal or test mode ends. DTC C1281/81 is output only in test mode.

DTC No.	DTC Detection Condition	Trouble Area
C1246/46	When one of following conditions is met: 1. At vehicle speed of 7 km/h (4.3 mph) or more, when PMC terminal voltage over 0.86 V, voltage does not change by 0.005 V or more for 30 seconds. 2. Noise occurs in the PMC terminal 7 times or more within 5 seconds. 3. When stop light switch OFF, PMC terminal voltage more than 0.86 V or less than 0.3 V for 5 seconds or more. 4. With IG1 terminal voltage between 9.5 V and 17.2 V, VCM terminal voltage not between 4.4 V and 5.6 V for 1.2 seconds or more. 5. When VCM terminal voltage between 4.4 V and 5.6 V, PCM terminal voltage not between 0.14 V and 4.85 V for 1.2 seconds or more.	<ul style="list-style-type: none"> Master cylinder pressure sensor Master cylinder pressure sensor circuit Stop light switch circuit ABS and TRACTION actuator
C1281/81	Detected only during test mode.	<ul style="list-style-type: none"> Master cylinder pressure sensor Master cylinder pressure sensor circuit Stop light switch circuit ABS and TRACTION actuator

INSPECTION PROCEDURE**NOTICE:**

When replacing the ABS and TRACTION actuator, perform zero point calibration (see page [BC-24](#)).

1	READ VALUE OF INTELLIGENT TESTER (STOP LIGHT SWITCH)
----------	---

- (a) Check the DATA LIST for proper functioning of the stop light switch.

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
STOP LAMP SW	Stop light switch / ON or OFF	ON: Brake pedal applied OFF: Brake pedal released	-

OK:

ON (brake pedal is depressed) appears on the screen.

NG**CHECK STOP LIGHT SWITCH CIRCUIT****OK**

2 READ VALUE OF INTELLIGENT TESTER (MASTER CYLINDER PRESSURE SENSOR)

- (a) Check the DATA LIST for proper functioning of the master cylinder pressure sensor.

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
MAS CYL PRESS 1	Master cylinder pressure sensor 1 reading / min.: 0 V, max.: 5 V	When brake pedal released: 0.3 to 0.9 V	-

OK:

When the pedal is depressed, the sensor output voltage increases.

NG**REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****OK****3 RECONFIRM DTC**

- (a) Clear the DTC(s) (see page [BC-47](#)).
(b) Drive the vehicle at a speed of 30 km/h (18 mph) or more and perform a braking test (decelerate the vehicle by depressing the brake pedal).
(c) Check if the same DTC(s) is recorded (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**END****A****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****BC**

DTC

C1249/49

Open in Stop Light Switch Circuit

DESCRIPTION

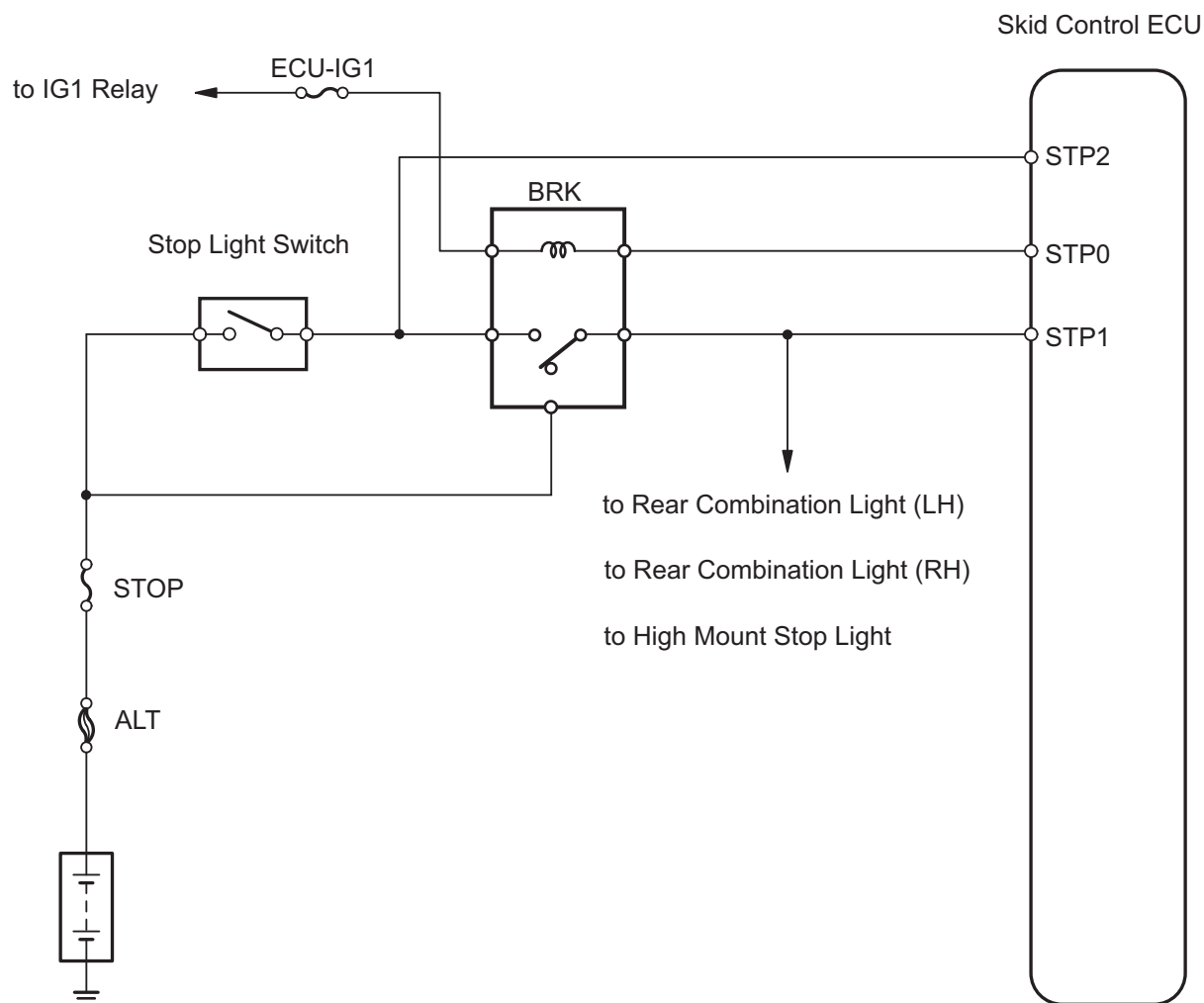
The skid control ECU detects the brake operating conditions through a signal transmitted by the stop light switch. The skid control ECU incorporates an open circuit detection circuit. This DTC is set under either of the following conditions:

- An open is detected in the stop light signal input line when the stop light switch is off.
- An open is detected in the stop light circuit lead to the ground when the stop light switch is off.

DTC No.	DTC Detection Condition	Trouble Area
C1249/49	<p>When either condition below is met:</p> <ol style="list-style-type: none"> When IG1 terminal voltage 9.5 to 17.2 V, open circuit of stop light switch continues for 0.3 seconds more. w/ 16-inch disc: With brake pedal load sensing switch ON, master pressure 2 MPa or more, vehicle deceleration 0.2 G or more (calculated based on vehicle speed), stop switch OFF condition continues for 2 seconds or more. 	<ul style="list-style-type: none"> ECU-IG1 fuse STOP fuse BRK relay Stop light switch Stop light switch circuit ABS and TRACTION actuator

WIRING DIAGRAM

BC



C135995E01

INSPECTION PROCEDURE

1 READ VALUE OF INTELLIGENT TESTER (STOP LIGHT SWITCH)

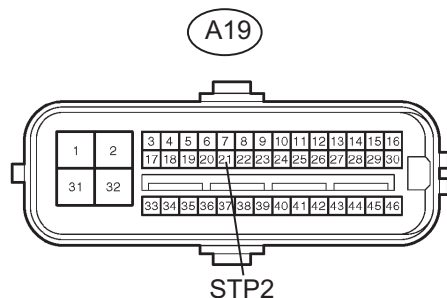
- (a) Check the DATA LIST for proper functioning of the stop light switch.

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Conditions	Diagnostic Note
STOP LAMP SW	Stop light switch / ON or OFF	ON: Brake pedal depressed OFF: Brake pedal released	-

OK:**ON (brake pedal is depressed) appears on the screen.****NG****Go to step 3****OK****2 CHECK WIRE HARNESS (STP VOLTAGE)****BC**

Wire Harness Side



C121700E42

- (a) Disconnect the A19 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Switch Condition	Specified Condition
A19-21 (STP2) - Body ground	Brake pedal depressed	8 to 14 V
A19-21 (STP2) - Body ground	Brake pedal released	Below 4.0 V

NG**Go to step 6****OK****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****3 INSPECT FUSE (STOP, ECU-IG1)**

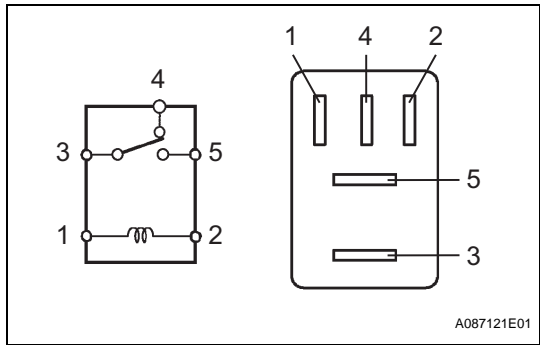
- (a) Remove the STOP fuse and ECU-IG1 fuse from the instrument panel junction block.
(b) Measure the resistance of the fuse.

Standard resistance:**Below 1 Ω** **NG****REPLACE FUSE**

OK

4

INSPECT STOP LIGHT CONTROL RELAY (Marking: BRK)



- (a) Remove the stop light control relay from the engine room No. 1 relay block.
- (b) Measure the resistance of the relay.

Tester Connection	Specified Condition
3 - 4	Below 1 Ω
3 - 5	10 k Ω or higher
3 - 4	10 k Ω or higher (when battery voltage is applied to terminals 1 and 2)
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG

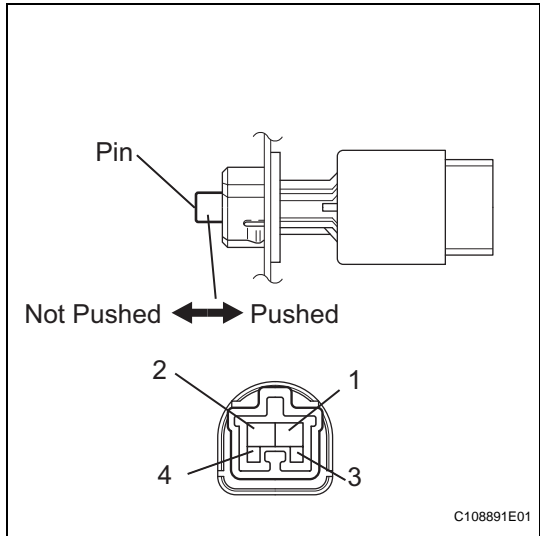
REPLACE STOP LIGHT CONTROL RELAY

BC

OK

5

INSPECT STOP LIGHT SWITCH ASSEMBLY



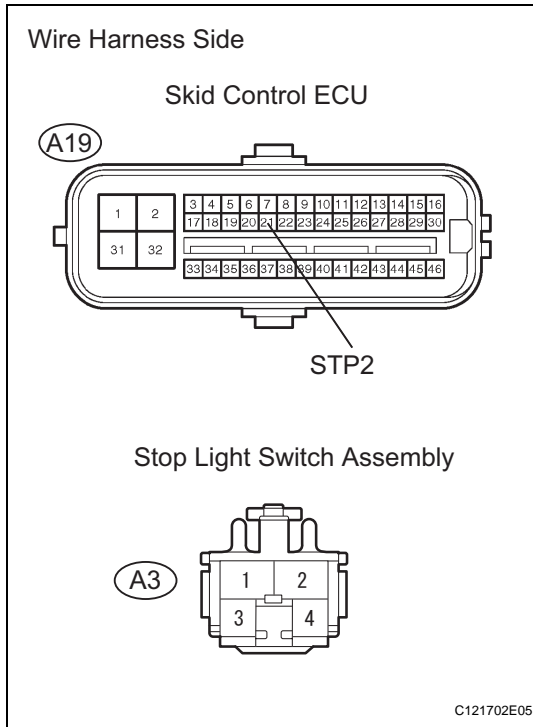
- (a) Disconnect the stop light switch connector.
- (b) Measure the resistance of the switch.
- Standard resistance**

Tester Connection	Switch Condition	Specified Condition
1 - 2	Pin not pushed	Below 1 Ω
1 - 2	Pin pushed	10 k Ω or higher
3 - 4	Pin not pushed	10 k Ω or higher
3 - 4	Pin pushed	Below 1 Ω

NG

REPLACE STOP LIGHT SWITCH ASSEMBLY

OK

6 CHECK WIRE HARNESS (SKID CONTROL ECU - STOP LIGHT SWITCH)

- (a) Disconnect the A19 ECU connector.
- (b) Disconnect the A3 switch connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A19-21 (STP2) - A3-1	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****7 RECONFIRM DTC**

- (a) Clear the DTC (see page [BC-47](#)).
- (b) Check if the same DTC is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**END****A****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****BC**

DTC**C1251/51****Open in Pump Motor Circuit****DESCRIPTION**

The motor relay drives the pump motor based on a signal from the skid control ECU.

DTC No.	DTC Detection Condition	Trouble Area
C1251/51	When either condition below is met: 1. Actuator pump motor does not operate properly. 2. Open in actuator pump motor circuit continues for at least 2 seconds.	<ul style="list-style-type: none"> Wire harness ABS and TRACTION actuator

WIRING DIAGRAM

Refer to DTC C0273/13, C0274/14, C1361/91 (see page [BC-79](#)).

INSPECTION PROCEDURE**1****PERFORM ACTIVE TEST BY INTELLIGENT TESTER (MOTOR RELAY)**

- (a) Select the ACTIVE TEST, generate a control command, and then check that the ABS motor relay operates.

BC**Skid control ECU**

Item	Test Details	Diagnosis Note
MOTOR RELAY	Turn ABS motor relay ON / OFF	Operation sound of motor can be heard

OK:

Operation sound of ABS motor is heard.

NG**Go to step 3****OK****2****RECONFIRM DTC**

- (a) Clear the DTC (see page [BC-47](#)).
 (b) Start the engine.
 (c) Drive the vehicle at a speed of 6 km/h (4 mph) or more for several seconds.
 (d) Check if the same DTC is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B**END****A****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**

3 INSPECT FUSE (ABS1)

- (a) Remove the ABS1 H-fuse from the engine room No. 1 relay block.

- (b) Measure the resistance of the fuse.

Standard resistance:

Below 1 Ω

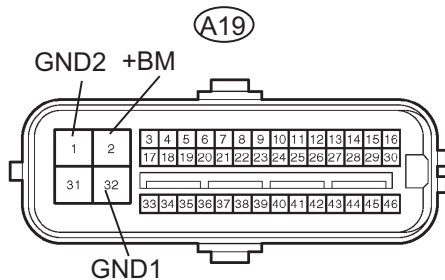
NG

REPLACE FUSE

OK

4 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)

Wire Harness Side



C121700E43

- (a) Disconnect the A19 connector.

- (b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
A19-32 (GND1) - Body ground	Below 1 Ω
A19-1 (GND2) - Body ground	Below 1 Ω

- (c) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Specified Condition
A19-2 (BM) - Body ground	10 to 14 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

BC

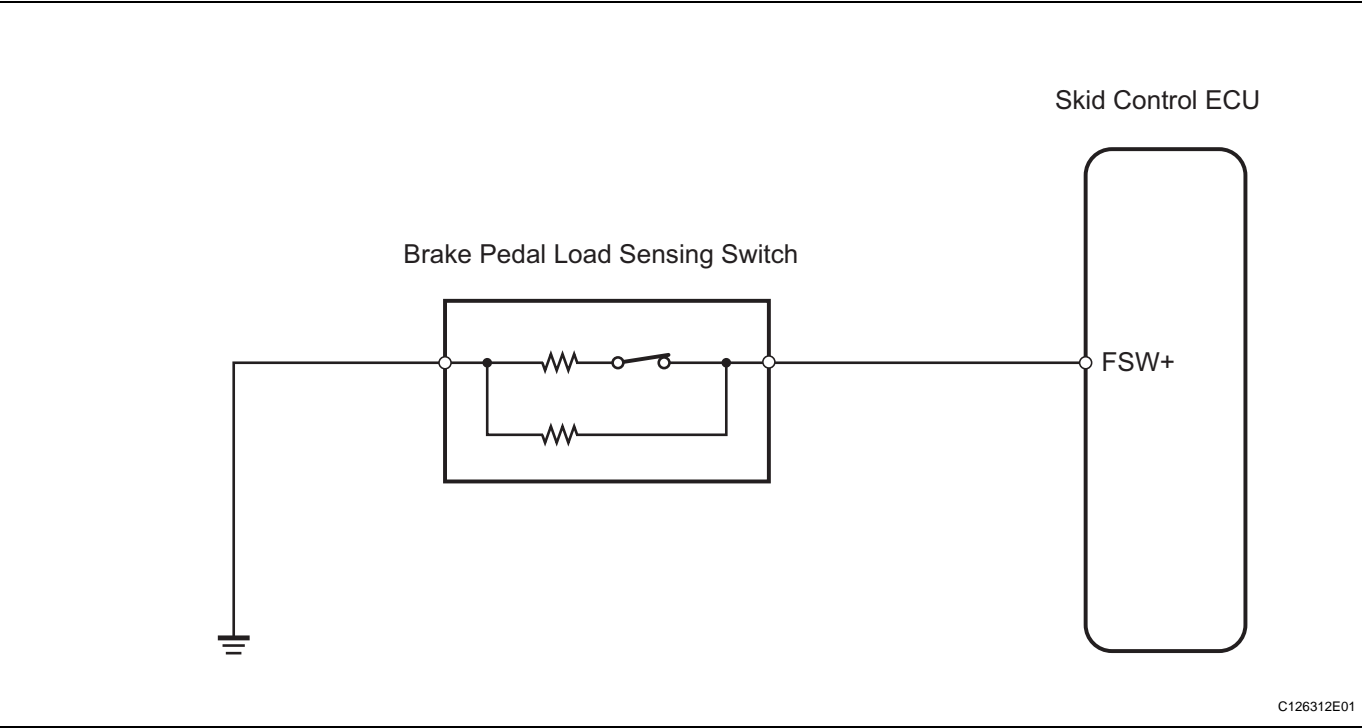
DTC	C1267/67	Brake Pedal Load Sensing Switch
-----	----------	---------------------------------

DESCRIPTION

The brake pedal load sensing switch is turned on when the brake pedal is depressed with force exceeding a predetermined level.
The skid control ECU detects if the brake pedal is depressed or not via this circuit.

DTC No.	DTC Detection Condition	Trouble Area
C1267/67	When one of following conditions is met: 1. An open or short in the brake pedal load sensing switch continues for 0.3 seconds or more. 2. Immediately after the ignition switch is turned ON, the brake pedal load sensing switch is ON and the stop light switch is OFF for 10 seconds or more. 3. While the vehicle speed change from 0 mph (0 km/h) to 18 mph (30 km/h), the condition that the brake pedal load sensing switch remains ON occurs 5 times in succession. 4. With the stop light switch ON, the brake pedal load sensing switch OFF, and the master cylinder pressure 6 Mpa or more, the deceleration is 0.4 G or more for 1 second or more. 5. With the stop light switch ON, the brake pedal load sensing switch OFF, and the master cylinder pressure 6 Mpa or more, the vehicle speed is 0 mph (0 km/h) for 5 seconds or more.	<ul style="list-style-type: none">Brake pedal load sensing switchBrake pedal load sensing switch circuit

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the brake actuator assembly, perform zero point calibration (see page BC-24).

HINT:

If DTC C1249/49 is output, repair it before repairing DTC C1267/67 based on the flowchart below.

1

READ VALUE OF INTELLIGENT TESTER (BRAKE PEDAL LOAD SENSING SWITCH)

- (a) Check the DATA LIST for proper functioning of the brake pedal load sensing switch.

Skid control ECU

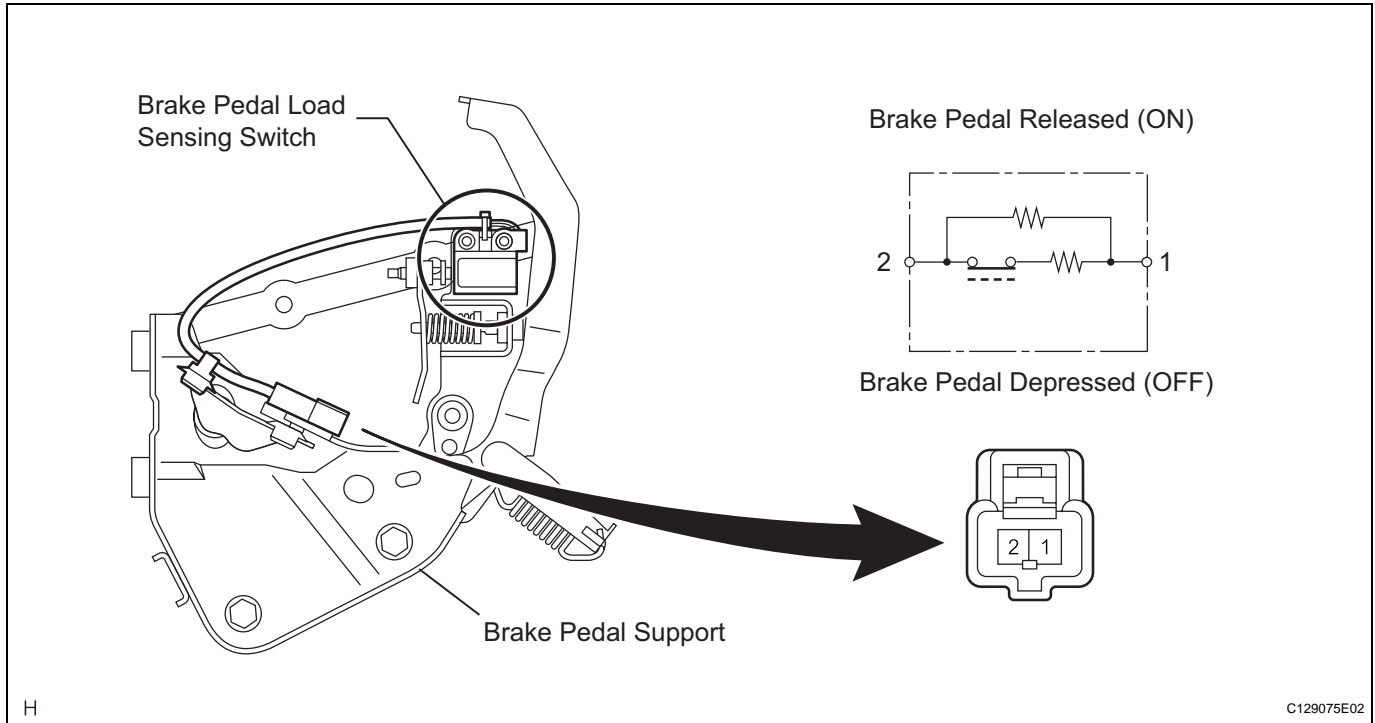
Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
BRAKE PEDAL SW	Brake pedal load sensing switch / ON or OFF	ON: Depressed brake pedal OFF: Released brake pedal	-

OK:

ON (brake pedal is depressed) appears on the screen.

OK
Go to step 4
NG
BC
2

INSPECT BRAKE PEDAL LOAD SENSING SWITCH



NOTICE:

- Do not remove the brake pedal load sensing switch from the brake pedal.
 - When there is a malfunction in the brake pedal load sensing switch, replace the brake pedal.
- (a) Turn the ignition switch OFF.

- (b) Disconnect the brake pedal load sensing switch connector.
- (c) Measure the resistance of the switch.

Standard resistance

Tester Connection	Condition	Specified Condition
2 - 1	Brake pedal depressed (OFF)	0.95 to 1.05 kΩ
2 - 1	Brake pedal released (ON)	202.4 to 223.7 Ω

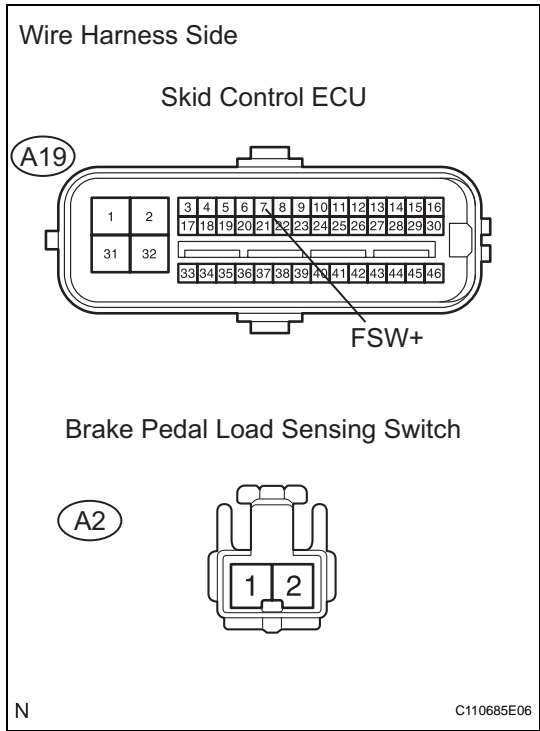
NG

REPLACE BRAKE PEDAL SUPPORT ASSEMBLY

OK

3

CHECK WIRE HARNESS (SKID CONTROL ECU - BRAKE PEDAL LOAD SENSING SWITCH)



- (a) Disconnect the A19 ECU connector.
- (b) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A19-7 (FSW+) - A2-2	Below 1 Ω
19-7 (FSW+) - Body ground	10 kΩ or higher
A2-1 - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4

RECONFIRM DTC

- (a) Clear the DTC (see page BC-47).
- (b) Check if the same DTC is recorded (see page BC-47).

Result

Result	Proceed to
DTC (C1267/67) is not output	A
DTC (C1267/67) is output	B

B

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

A

USE SIMULATION METHOD TO CHECK

BC

DTC**C1290/66****Steering Angle Sensor Zero Point Malfunction****DESCRIPTION**

The skid control ECU learns the steering sensor zero point every time the ignition switch is turned ON and the vehicle is driven at 35 km/h (22 mph) or more for approximately 5 seconds. The ECU also stores the previous zero point.

If front wheel alignment or the steering wheel position is adjusted without disconnecting the negative battery terminal, or if the yaw rate and deceleration sensor zero point is not set after the adjustments have been completed, the skid control ECU detects the difference between the previously stored zero point and the newly learned zero point and outputs this DTC to indicate a poor adjustment.

Indication of the steering sensor zero point malfunction is canceled by turning the ignition switch OFF.

DTC No.	DTC Detection Condition	Trouble Area
C1290/66	Steering sensor zero point calibration position differs significantly from recorded value	<ul style="list-style-type: none"> • Yaw rate and deceleration sensor zero point calibration incomplete • Poor adjustment of centered position of steering wheel • Poor adjustment of front wheel alignment

INSPECTION PROCEDURE**NOTICE:****BC**

When replacing the ABS and TRACTION actuator, perform zero point calibration (see page [BC-24](#)).

1**PERFORM YAW RATE AND DECELERATION SENSOR ZERO POINT CALIBRATION**

- (a) Perform the zero point calibration of the yaw rate and deceleration sensor (see page [BC-24](#)).

HINT:

- When the stored zero point of the yaw rate and deceleration sensor is erased, the steering sensor zero point is also erased.
- If the zero point and output value of the yaw rate and deceleration sensor and the output values of the speed sensors are not normal, the steering sensor zero point cannot be learned normally even if the vehicle is driven straight ahead at 35 km/h (22 mph) or more.

NEXT**2****CHECK STEERING SENSOR**

- (a) Drive the vehicle straight ahead at 35 km/h (22 mph) or more for 5 seconds or more.
- (b) Check that the centered position of the steering wheel is correctly set while driving straight ahead.

HINT:

If the front wheel alignment and steering position are adjusted due to an incorrectly centered position of the steering wheel, set the yaw rate and deceleration sensor zero point again after the adjustments are completed.

OK:

The center position of the steering wheel is correctly set.

NG**ADJUST FRONT WHEEL ALIGNMENT****OK****3****RECONFIRM DTC**

- (a) Turn the ignition switch OFF.
- (b) Clear the DTC (see page [BC-47](#)).
- (c) Check if the same DTC is recorded (see page [BC-47](#)).

Result

Result	Proceed to
DTC (C1290/66) is not output	A
DTC (C1290/66) is output	B

B**REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****A****BC****USE SIMULATION METHOD TO CHECK**

DTC**C1337/37****Different Diameter Tire Malfunction****DESCRIPTION**

The skid control ECU measures the speed of each wheel by receiving signals from the speed sensor. These signals are used for recognizing that all 4 wheels are operating properly. Therefore, all wheel signals must be equal.

DTC No.	DTC Detection Condition	Trouble Area
C1337/37	With vehicle speed at 20 km/h (12 mph), condition that difference in average speed between front wheels and rear wheels is 20% or more continues for 20 seconds, and occurs consecutively 3 times each time the vehicle is driven.	Tire size

INSPECTION PROCEDURE**1****CHECK TIRE SIZE**

- (a) Check the diameter of all 4 tires.

OK:

Diameter of all 4 tires are equal.

NG**REPLACE TIRES WITH 4 EQUAL SIZE TIRES****OK****2****CHECK SPEED SENSOR ROTOR**

- (a) Remove the drive shaft, and check around the speed sensor rotor.

OK:

No scratches or foreign matter on the sensor tip.

NG**REPLACE SPEED SENSOR ROTOR****OK****3****CHECK SPEED SENSOR**

- (a) Check the speed sensor circuit (see page [BC-64](#) or [BC-70](#)).

NG**REPLACE SPEED SENSOR****OK****4****CHECK WIRE HARNESS (SKID CONTROL ECU - EACH SPEED SENSOR)**

- (a) Check the speed sensor circuit (see page [BC-69](#) or [BC-70](#)).

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

5**RECONFIRM DTC**

- (a) Clear the DTCs (see page [BC-47](#)).
- (b) Drive the vehicle at more than 20 km/h (12 mph) for more than 60 seconds.
- (c) Check if the same DTCs are detected.

Result

Result	Proceed to
DTC is output	A
DTC is not output	B

B

END

A

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**BC**

DTC	C1379/74	Downhill Assist Control Operation Switch (Test Mode DTC)
-----	----------	--

DESCRIPTION

The downhill assist control switch is connected to the skid control ECU in the ABS and TRACTION actuator.

DTC C1379/74 can be detected when the downhill assist control switch sends the downhill assist control switch signal or test mode ends. DTC C1379/74 is output only in test mode.

DTC No. DTC	DTC Detection Condition	Trouble Area
C1379/74	Detected only during test mode.	Downhill assist control switch

WIRING DIAGRAM

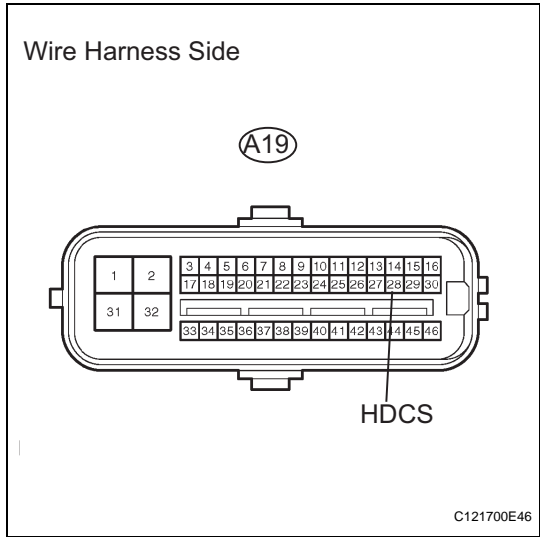
Refer to downhill assist control switch circuit (see page [BC-157](#)).

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS and TRACTION actuator, perform zero point calibration (see page [BC-24](#)).

BC	1	CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)
----	---	---



NG

(a) Disconnect the A19 ECU.

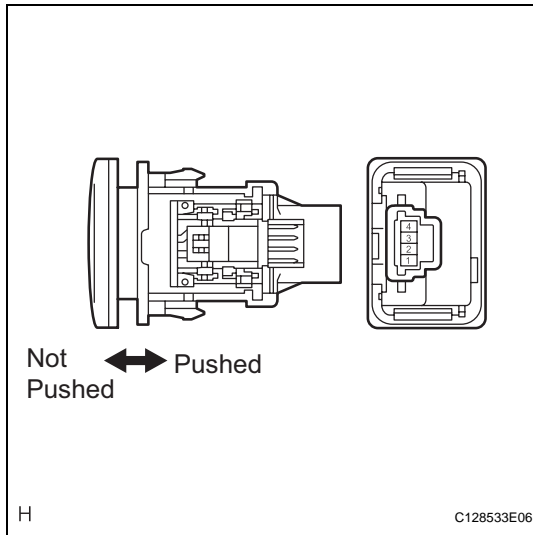
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
A19-28 (HDCS) - Body ground	Downhill assist control switch is not pushed	10 kΩ or higher

OK

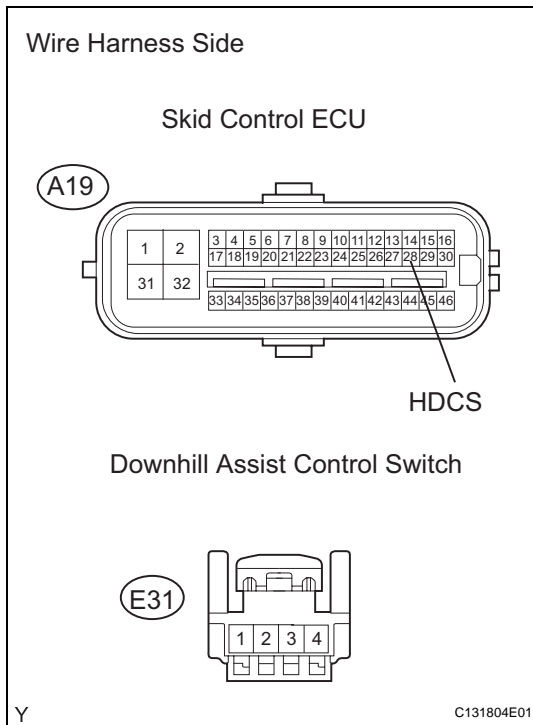
REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

2 INSPECT DOWNHILL ASSIST CONTROL SWITCH

- (a) Remove the downhill assist control switch.
 (b) Measure the resistance of the switch.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
4 - 1	Switch is pushed	Below 1 Ω
4 - 1	Switch is not pushed	10 k Ω or higher

NG**REPLACE DOWNHILL ASSIST CONTROL SWITCH****OK****BC****3 CHECK WIRE HARNESS (SKID CONTROL ECU - DOWNHILL ASSIST CONTROL SWITCH)**

- (a) Disconnect the A19 ECU connector.
 (b) Disconnect the E31 switch connector.
 (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A19-28 (HDCS) - E31-4	Below 1 Ω
E31-4 - Body ground	Below 1 Ω
A19-28 (HDCS) - Body ground	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**

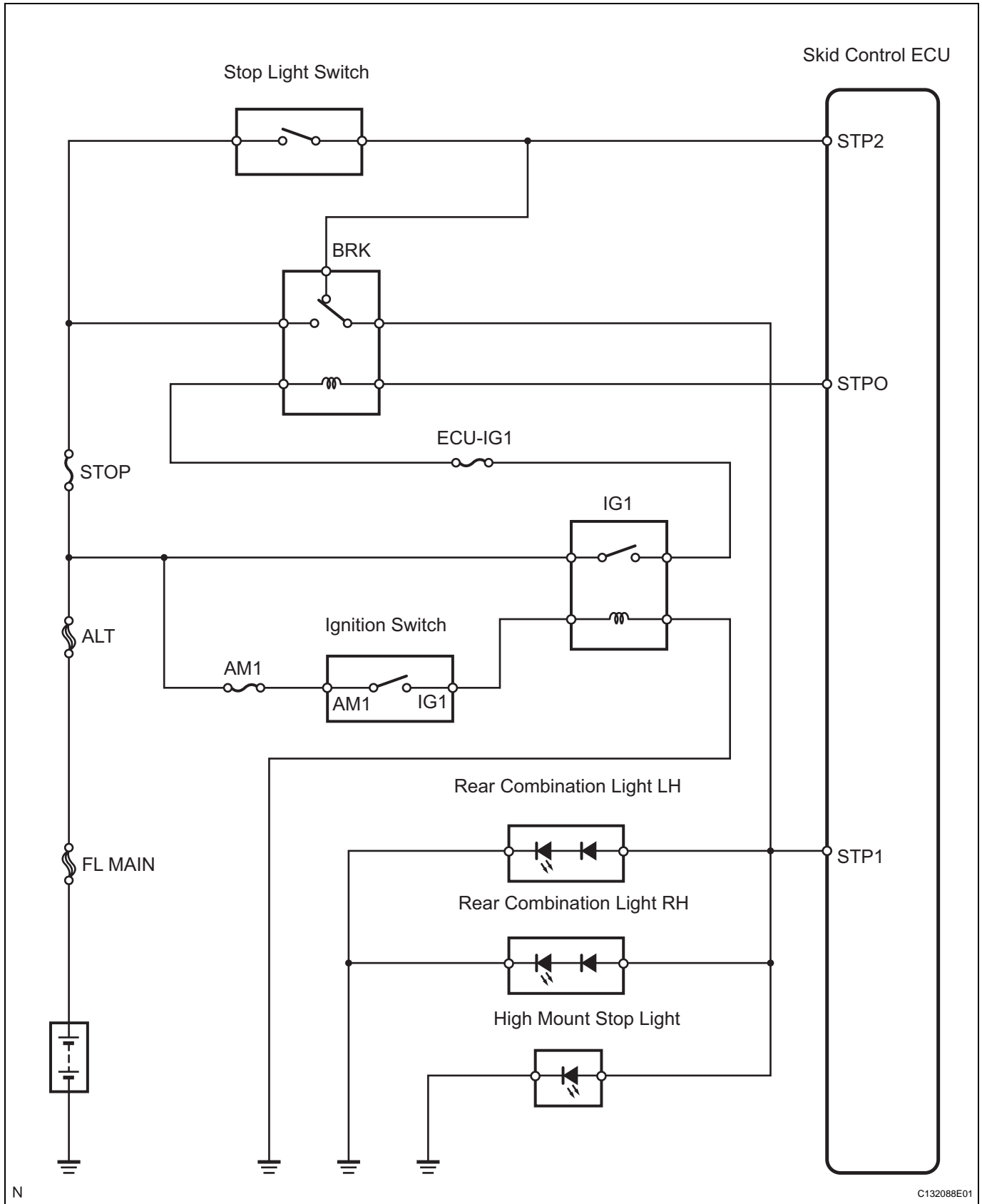
DTC	C1380/64	Stop Light Control Relay Malfunction
-----	----------	--------------------------------------

DESCRIPTION

The skid control ECU inputs the stop light switch signal and detects the status of the brake operation.

DTC No.	DTC Detection Condition	Trouble Area
C1380/64	When one of following conditions is met: 1. When stop light control relay is ON, relay OFF condition continues for 5 seconds or more. 2. When stop light control relay is OFF, relay ON condition continues for 5 seconds. 3. When stop light control relay is OFF, stop switch monitor (STP2) OFF condition continues for 5 seconds or more.	<ul style="list-style-type: none">• Stop light• Stop light switch circuit• Stop light control (BRK) relay• ABS and TRACTION actuator (skid control ECU)

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS and TRACTION actuator, perform zero point calibration (see page [BC-24](#)).

1

CHECK STOP LIGHT (OPERATION)

- (a) Check that the light illuminates when the brake pedal is depressed, and turns off when the brake pedal is released.

OK

Condition	Stop Light Condition
Brake pedal depressed	Illuminates
Brake pedal released	Turn off

NG

Go to step 9

OK

2

CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY)

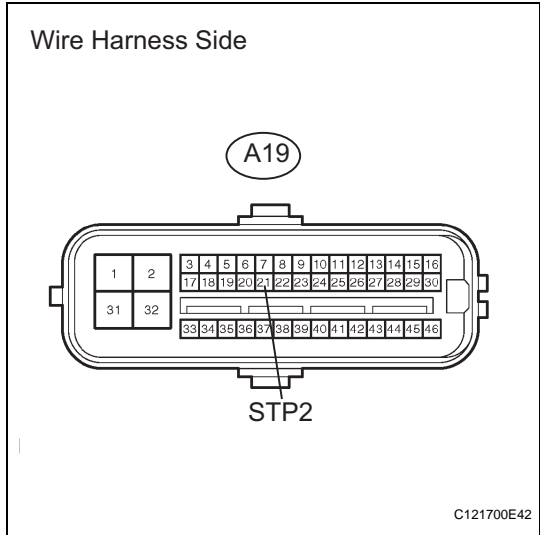
- (a) Disconnect the A19 ECU connector.
(b) Measure the voltage of the wire harness side connector.

Standard voltage

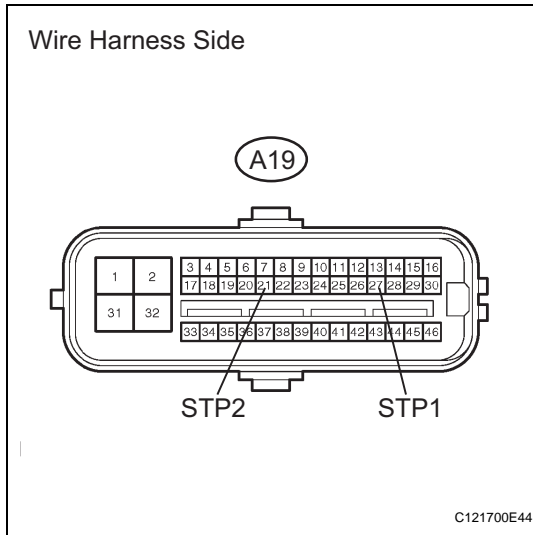
Tester Connection	Switch Condition	Specified Condition
A19-21 (STP2) - Body ground	Brake pedal depressed	8 to 16 V
A19-21 (STP2) - Body ground	Brake pedal released	Below 1.5 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR



OK

3 CHECK WIRE HARNESS (SKID CONTROL ECU)

- Disconnect the A19 ECU connector.
- Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
A19-21 (STP2) - A19-27 (STP1)	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****4 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (STOP LIGHT RELAY)**

- Select the ACTIVE TEST, generate a control command, and then check that the stop light relay operates.

Skid control ECU

Item	Test Details	Diagnosis Note
STP LAMP RELAY	Turn stop light relay ON / OFF	Observe stop light

OK:**The stop lights illuminate or turn off.****NG****Go to step 6****OK****5 RECONFIRM DTC**

- Clear the DTC (see page [BC-47](#)).
- Start the engine.
- Drive the vehicle at a speed of 5 km/h (3 mph) or more for several seconds.
- Check if the same DTC is output (see page [BC-47](#)).

Result

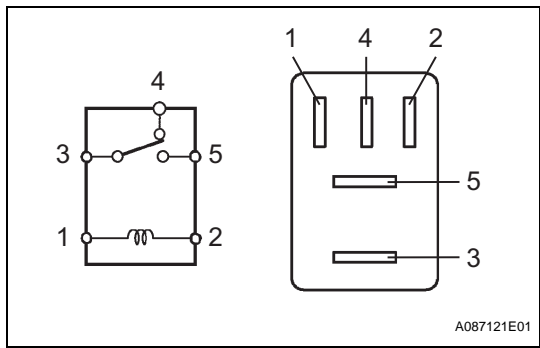
Result	Proceed to
DTC is not output	A
DTC is output	B

B**END****BC**

A

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

6INSPECT STOP LIGHT CONTROL RELAY (Marking: BRK)



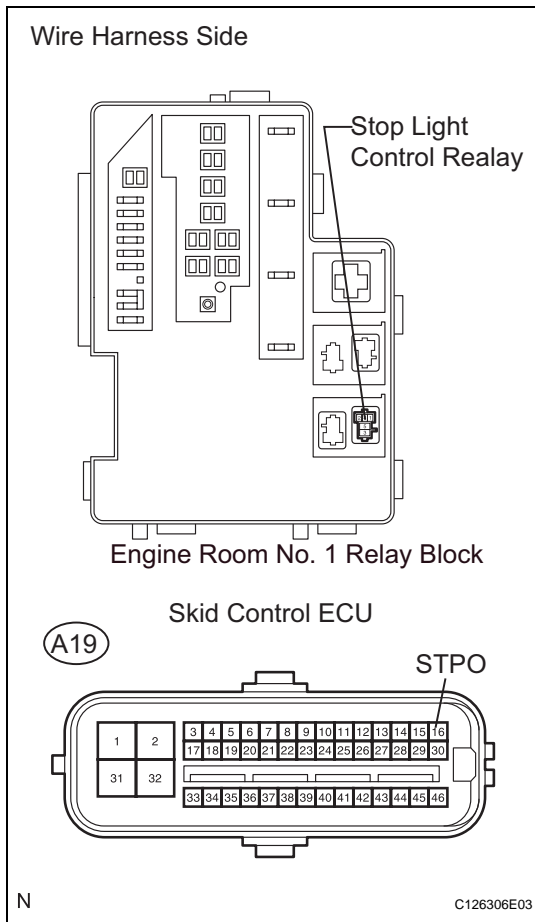
- (a) Remove the stop light control relay from the engine room No. 1 relay block.
 - (b) Measure the resistance of the relay.
- Standard resistance**

Tester Connection	Specified Condition
3 - 4	Below 1 Ω
3 - 5	10 k Ω or higher
3 - 4	10 k Ω or higher (when battery voltage is applied to terminals 1 and 2)
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG

REPLACE STOP LIGHT CONTROL RELAY

OK

7**CHECK WIRE HARNESS (ENGINE ROOM NO. 1 RELAY BLOCK - SKID CONTROL ECU AND BATTERY)**

- Remove the stop light control relay.
- Disconnect the A19 ECU connector.
- Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
BRK relay terminal 5 - Body ground	Always	8 to 16 V
BRK relay terminal 2- Body ground	Ignition switch ON	8 to 16 V

- Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
BRK relay terminal 1 - A19-16 (STPO)	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****BC****OK****8****RECONFIRM DTC**

- Clear the DTC (see page [BC-47](#)).
- Start the engine.
- Drive the vehicle at a speed of 5 km/h (3 mph) or more for several seconds.
- Check if the same DTC is output (see page [BC-47](#)).

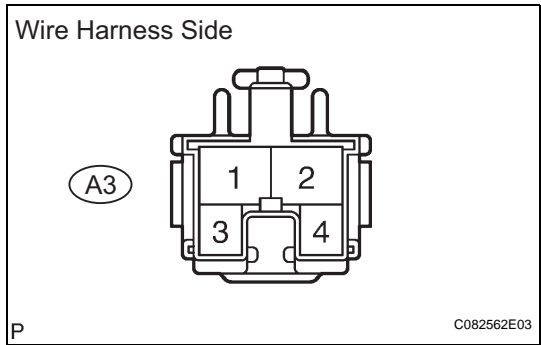
Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**END****A****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**

9

CHECK WIRE HARNESS (STOP LIGHT SWITCH - BATTERY)



- (a) Disconnect the A3 switch connector.
- (b) Measure the voltage of the wire harness side connector.
- Standard voltage**

Tester Connection	Specified Condition
A3-2 - Body ground	10 to 14 V

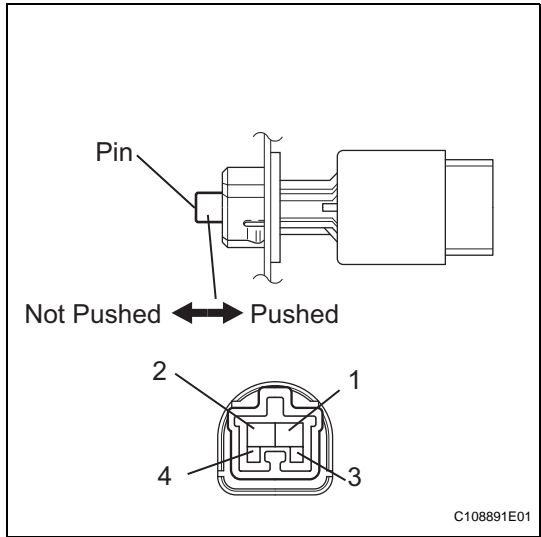
NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

10

INSPECT STOP LIGHT SWITCH ASSEMBLY



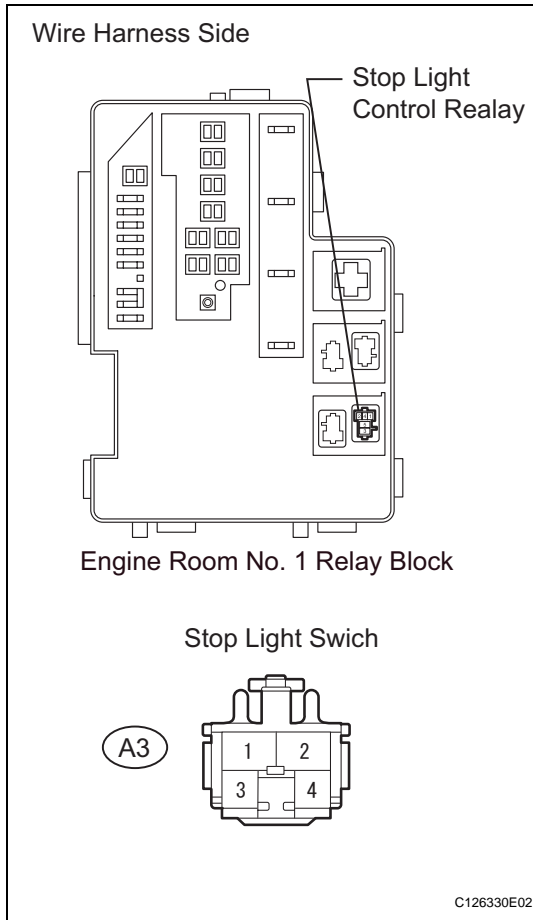
- (a) Remove the stop light switch connector.
- (b) Measure the resistance of the switch.
- Standard resistance**

Tester Connection	Switch Condition	Specified Condition
1 - 2	Switch pin not pushed	Below 1 Ω
1 - 2	Switch pin pushed	10 k Ω or higher
3 - 4	Switch pin not pushed	10 k Ω or higher
3 - 4	Switch pin pushed	Below 1 Ω

NG

REPLACE STOP LIGHT SWITCH ASSEMBLY

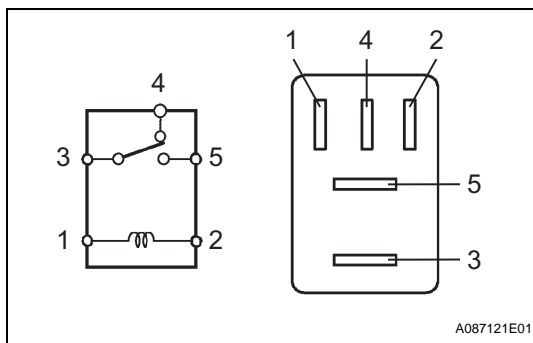
OK

11 CHECK WIRE HARNESS (STOP LIGHT SWITCH - STOP LIGHT CONTROL RELAY)

- Disconnect the A3 switch connector.
- Remove the stop light control relay.
- Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A3-1 - BKR relay terminal 4	Below 1 Ω
A3-1 - Body ground	10 k Ω or higher

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****12 INSPECT STOP LIGHT CONTROL RELAY (Marking: BRK)**

- Remove the stop light control relay from the engine room No. 1 relay block.
- Measure the resistance of the relay.

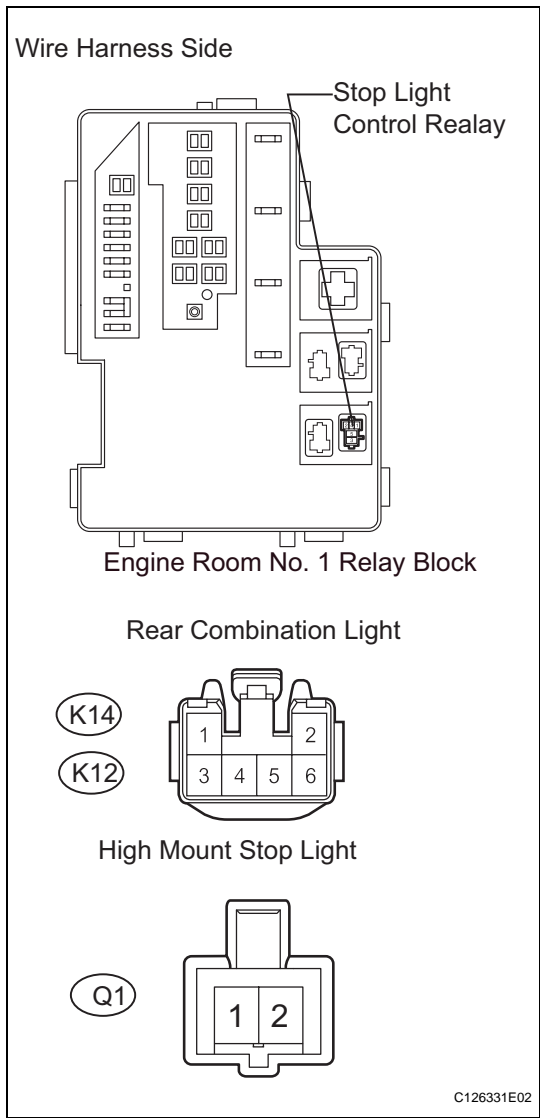
Standard resistance

Tester Connection	Specified Condition
3 - 4	Below 1 Ω
3 - 5	10 k Ω or higher
3 - 4	10 k Ω or higher (when battery voltage is applied to terminals 1 and 2)
3 - 5	Below 1 Ω (when battery voltage is applied to terminals 1 and 2)

NG**REPLACE STOP LIGHT CONTROL RELAY****OK****BC**

13

CHECK WIRE HARNESS (STOP LIGHT AND REAR COMBINATION LIGHT - CONTROL RELAY)



- (a) Disconnect the Q1, K12 and K14 light connectors.
(b) Remove the stop light control relay.
(c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
K14-4 - BKR relay terminal 3	Below 1 Ω
K14-4 - Body ground	10 k Ω or higher
K14-1 - Body ground	Below 1 Ω
K12-4 - BKR relay terminal 3	Below 1 Ω
K12-4 - Body ground	10 k Ω or higher
K12-1 - Body ground	Below 1 Ω
Q1-2 - BKR relay terminal 3	Below 1 Ω
Q1-2 - Body ground	10 k Ω or higher
Q1-1 - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

CHECK FOR INTERMITTENT PROBLEMS

DTC	U0073/94	Control Module Communication Bus OFF
DTC	U0100/65	Lost Communication with ECM / PCM
DTC	U0123/62	Lost Communication with Yaw Rate Sensor Module
DTC	U0124/95	Lost Communication with Lateral Acceleration Sensor Module
DTC	U0126/63	Lost Communication with Steering Angle Sensor Module

DESCRIPTION

DTC No.	DTC Detection Condition	Trouble Area
U0073/94	When one of following conditions is met: 1. With the IG1 terminal voltage 10 V or more, after the output of data from the skid control ECU is completed, the sending continues for 5 seconds or more. 2. The condition that bus OFF state occurs once or more within 100 ms occurs 10 times in succession. (Sent signals cannot be received.) 3. With the IG1 terminal voltage 10 V or more, a delay in receiving data from the yaw rate and acceleration sensor and steering angle sensor continues for 1 second or more. 4. With the IG1 terminal voltage 10 V or more, the condition that a delay in receiving data from the yaw rate and acceleration sensor occurs more than once within 5 seconds occurs 10 times in succession.	CAN communication system
U0100/65	When either condition below is met: 1. With the IG1 terminal voltage 10 V or more and the vehicle speed 15 km/h (9 mph) or more, data cannot be sent to the ECM for 2 seconds or more. 2. With the IG1 terminal voltage 10 V or more and the vehicle speed 15 km/h (9 mph) or more for 2 seconds or more.	CAN communication system (Skid control ECU to ECM)
U0123/62	When either condition below is met: 1. With the IG1 terminal voltage 10 V or more, data from the acceleration sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession within 60 seconds. (a) The condition that data from the acceleration sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)
U0124/95	When either condition below is met: 1. With the IG1 terminal voltage 10 V or more, data from the acceleration sensor cannot be received for 1 second or more. 2. With the IG1 terminal voltage 10 V or more, the following occurs 10 times in succession within 60 seconds. (a) The condition that data from the acceleration sensor cannot be received occurs once or more within 5 seconds.	CAN communication system (Skid control ECU to yaw rate and acceleration sensor)

BC

DTC No.	DTC Detection Condition	Trouble Area
U0126/63	When either of following conditions detected: 1. When IG1 terminal voltage 10 V or more, data from steering sensor cannot be received for 1 second or more. 2. When IG1 terminal voltage 10 V or more, following condition occurs 10 times in succession.	CAN communication system

INSPECTION PROCEDURE

The skid control ECU inputs the signals from the ECM, steering angle sensor, and yaw rate and acceleration sensor via CAN communication system.

1 CHECK HARNESS AND CONNECTOR (MOMENTARY INTERRUPTION)

- (a) Using the DATA LIST of the intelligent tester, check for any momentary interruption in the wire harness and connector corresponding to a DTC (see page BC-23).

Skid control ECU:

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
EFI COM OPN	EFI communication open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
STEERING OPN	Steering sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-
YAW RATE OPN	Yaw rate sensor open detection / ERROR or NORMAL	ERROR: Momentary interruption NORMAL: Normal	-

Result

Condition	Proceed to
There is a constant open circuit	A
There are no momentary interruptions	B
There are momentary interruptions	C

HINT:

Perform the above inspection before removing the sensor and connector.

B

Go to step 3

C

Go to step 4

A

2 CHECK IF EACH SENSOR AND ECM CONNECTOR IS SECURELY CONNECTED

- (a) Check if each sensor or ECM connector is securely connected.

OK:

The connector should be securely connected.

NG

CONNECT CONNECTOR TO EACH SENSOR OR ECM CORRECTLY

OK

3 RECONFIRM DTC

- (a) Record the output DTCs (for ABS, VSC and CAN communication) (see page [BC-47](#)).

HINT:

If the CAN communication system DTC and the relevant sensor DTCs are output simultaneously, troubleshoot the relevant sensor DTCs (for ABS and VSC) after the CAN communication system returns to normal.

Result

Condition	Proceed to
DTC (CAN communication system DTC) is not output	A
DTC (ABS and/or VSC DTC) is output	B
DTC is not output	C

B

REPAIR CIRCUIT INDICATED BY OUTPUT CODE

C

USE SIMULATION METHOD TO CHECK

BC

A

INSPECT CAN COMMUNICATION SYSTEM**4 REPAIR OR REPLACE HARNESS AND CONNECTOR**

- (a) Repair or replace the harness or connector.
 (b) Check for any momentary interruption between the skid control ECU and each sensor or ECM (see page [BC-23](#)).
 (c) Check that there is no momentary interruption.

NEXT

5 RECONFIRM DTC

- (a) Clear the DTC (see page [BC-47](#)).
 (b) Turn the ignition switch ON.
 (c) Drive the vehicle and turn the steering wheel to the right and left at a speed of 15 km/h (9 mph) or more.
 (d) Check that no CAN communication system DTC is output (see page [BC-47](#)).
 (e) If ABS and/or VSC DTCs are output, record them.

Result

Condition	Proceed to
DTC for the CAN communication system is not output	A
No DTC is output (ABS and/or VSC DTC are output)	B

Condition	Proceed to
No DTC is output (No ABS and/or VSC DTC are output)	C

HINT:
The CAN communication system must be normal when repairing the sensor DTCs (for ABS and VSC).

B	REPAIR CIRCUIT INDICATED BY OUTPUT CODE
C	END



INSPECT CAN COMMUNICATION SYSTEM

ABS Warning Light Remains ON

DESCRIPTION

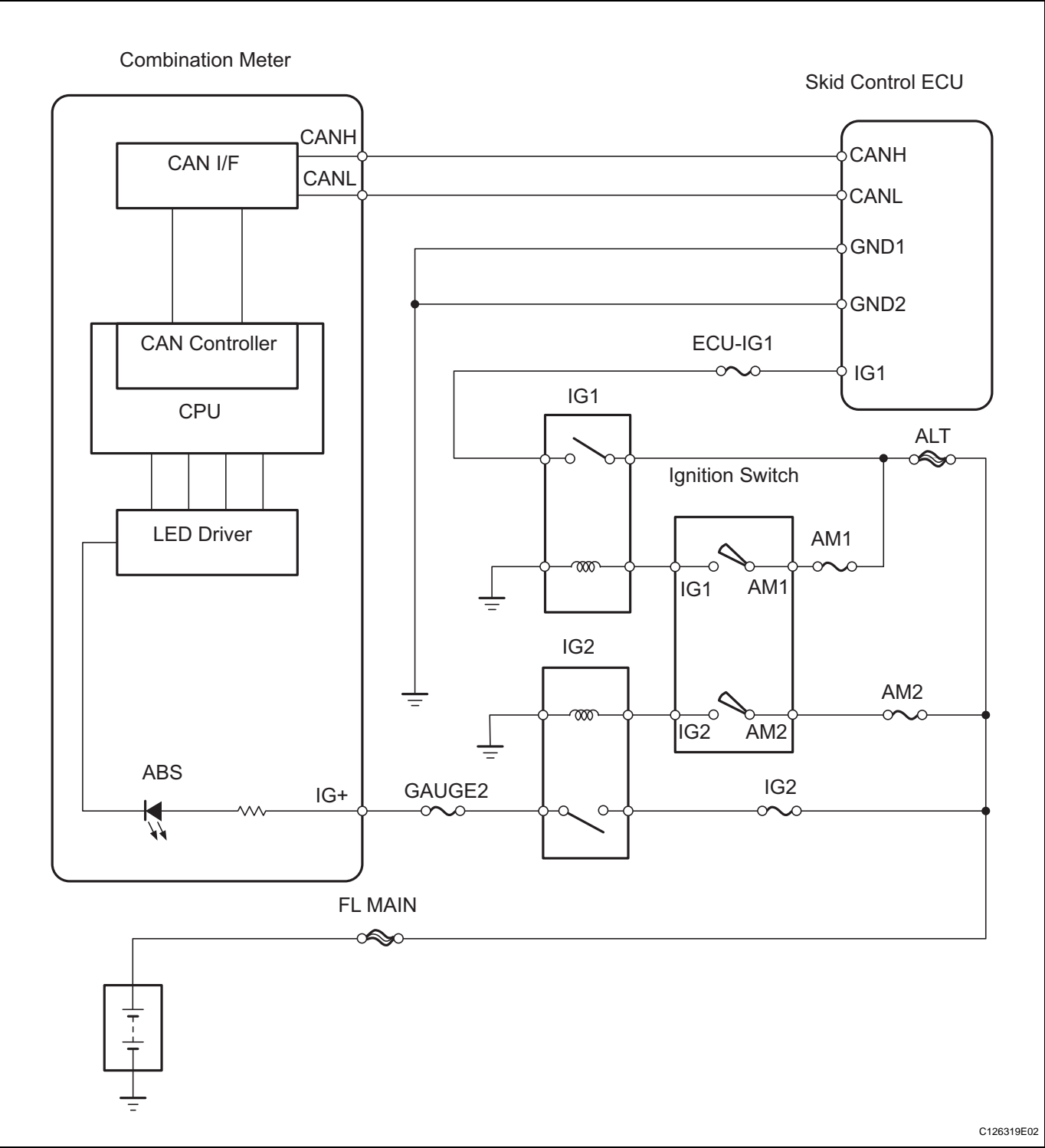
If any of the following conditions are detected, the ABS warning light remains on:

1. The ECU connectors are disconnected from the skid control ECU.
2. There is a malfunction in the skid control ECU internal circuit.
3. There is an open or short in the wire harness between the combination meter and the skid control ECU.

HINT:

The intelligent tester may not be used when there is a malfunction in the skid control ECU.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR CAN COMMUNICATION SYSTEM****A****2 INSPECT SKID CONTROL ECU CONNECTOR**

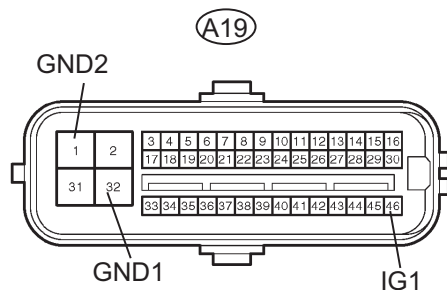
- (a) Check if the skid control ECU connector is properly installed.

OK:

The skid control ECU connector is properly installed.

NG**CONNECT CONNECTOR TO ECU SECURELY****OK****3 CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)**

Wire Harness Side



C121700E47

- (a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
A19-32 (GND1) - Body ground	Below 1 Ω
A19-1 (GND2) - Body ground	Below 1 Ω

- (c) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
A19-46 (IG1) - Body ground	Ignition switch ON	10 to 14 V

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****BC**

4

PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS WARNING LIGHT)

- (a) Select the ACTIVE TEST, generate a control command, and then check that the ABS warning light operates.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
ABS WARN LAMP	Turns ABS warning light / ON or OFF	Observe combination meter

OK:
The ABS warning light is turned on or off.

HINT:
When the ABS warning light remains illuminated, opens in the wire harness of the combination meters or abnormalities in the meter circuit should be considered.

OK

NG

CHECK METER / GAUGE SYSTEM

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

ABS Warning Light does not Come ON**WIRING DIAGRAM**

Refer to the ABS warning light circuit (see page [BC-135](#)).

INSPECTION PROCEDURE**1 CHECK CAN COMMUNICATION SYSTEM**

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR CAN COMMUNICATION SYSTEM****A****2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (ABS WARNING LIGHT)**

- (a) Select the ACTIVE TEST, generate a control command, and then check that the ABS warning light operates.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
ABS WARN LAMP	Turns ABS warning light / ON or OFF	Observe combination meter

OK:

The ABS warning light turns on or off.

NG**CHECK METER / GAUGE SYSTEM****OK****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****BC**

VSC Warning Light Remains ON**DESCRIPTION**

The skid control ECU is connected to the combination meter via the CAN communication system.

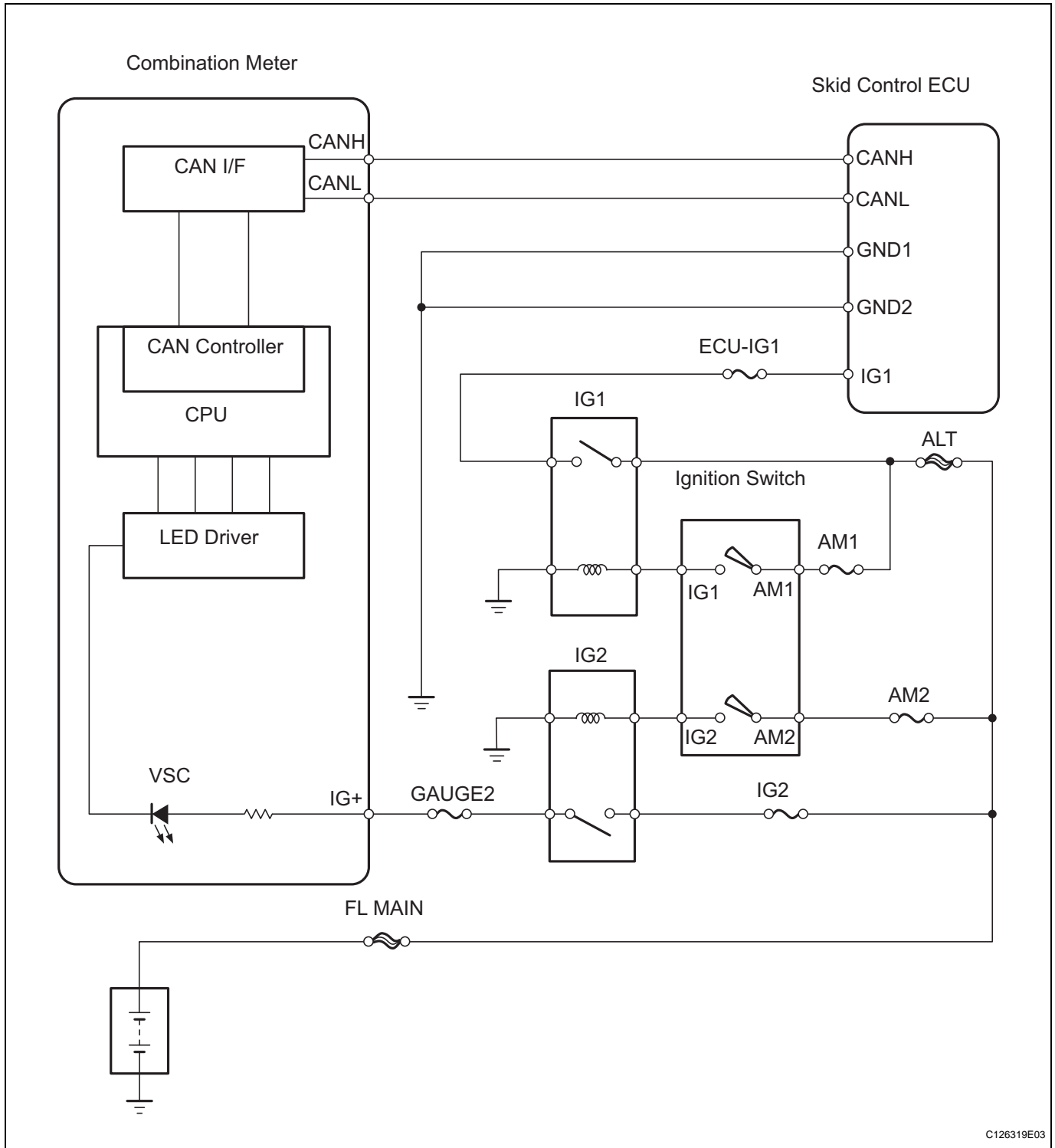
w/o Multi information display:

If the skid control ECU stores any DTCs which relate to the VSC system, the VSC warning light comes on in the combination meter.

w/ Multi information display:

If the skid control ECU stores any DTCs which relate to the VSC system, the master caution indicator light comes on and the warning message is displayed on the multi information display in the combination meter.

WIRING DIAGRAM



INSPECTION PROCEDURE

NOTICE:

When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page [BC-24](#)).

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

NG**REPAIR CAN COMMUNICATION SYSTEM****OK****2 INSPECT SKID CONTROL ECU CONNECTOR**

- (a) Check if the skid control ECU connector is securely connected.

OK:

The connector is securely connected.

NG**CONNECT CONNECTOR CORRECTLY****OK****3 CHECK COMBINATION METER ASSEMBLY**

- (a) Check the combination meter (see page [ME-15](#)).

NG**REPLACE COMBINATION METER ASSEMBLY****OK****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****BC**

VSC Warning Light does not Come ON**DESCRIPTION**

Refer to the description of "VSC Warning Light Remains ON" (see page [BC-139](#)).

WIRING DIAGRAM

Refer to the VSC warning light circuit (see page [BC-140](#)).

INSPECTION PROCEDURE**NOTICE:**

When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page [BC-24](#)).

1 INSPECT CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR CAN COMMUNICATION SYSTEM****A****2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (VSC WARNING LIGHT)**

- (a) Select the ACTIVE TEST, generate a control command, and then check that the VSC warning light operates.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
VSC WARN LAMP	Turn VSC warning light ON / OFF	Observe combination meter

OK:

The VSC warning light turns on or off.

OK**REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****NG****3 CHECK COMBINATION METER ASSEMBLY**

- (a) Check the combination meter (see page [CA-34](#)).

NG**REPLACE COMBINATION METER ASSEMBLY****BC**

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

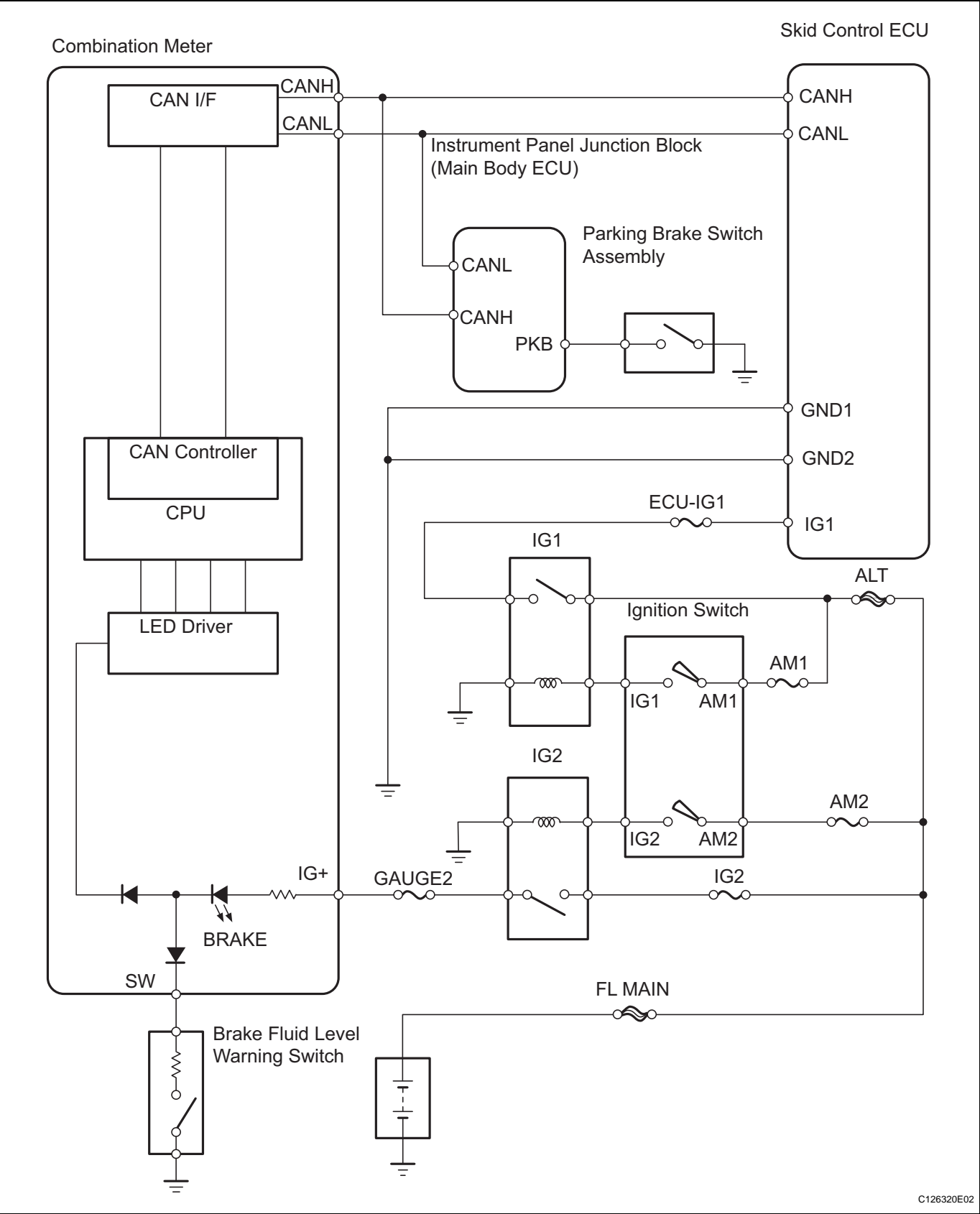
Brake Warning Light Remains ON

DESCRIPTION

If any of the following conditions are detected, the brake warning light remains on:

1. The ECU connectors are disconnected from the skid control ECU.
2. The brake fluid level is insufficient.
3. The parking brake is applied.
4. The EBD is defective.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 PREPARE FOR INSPECTION

- (a) Check that both of the following conditions are satisfied.
- The brake fluid level in the brake master cylinder reservoir is correct.
 - The parking brake is released.

HINT:

When the ABS warning light remains illuminated, repair the malfunctions in the ABS system first.

NEXT

2 CHECK DTC FOR ABS

- (a) Check if any ABS DTCs are output (see page [BC-47](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CIRCUITS INDICATED BY OUTPUT DTCs

A

3 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

4 INSPECT SKID CONTROL ECU CONNECTOR

- (a) Check if the skid control ECU connector is properly installed.

OK:

The skid control ECU connector is properly installed.

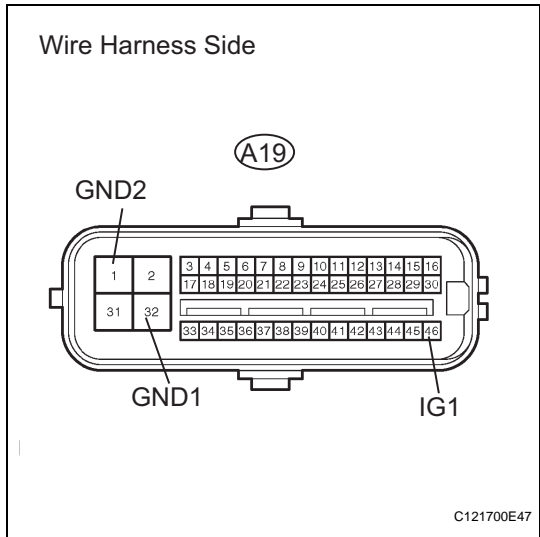
NG

CONNECT CONNECTOR TO ECU SECURELY

OK

5

CHECK WIRE HARNESS (SKID CONTROL ECU - BATTERY AND BODY GROUND)



- (a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Specified Condition
A19-32 (GND1) - Body ground	Below 1 Ω
A19-1 (GND2) - Body ground	Below 1 Ω

- (c) Measure the voltage of the wire harness side connector.

Standard voltage

Tester Connection	Condition	Specified Condition
A19-46 (IG1) - Body ground	Ignition switch ON	10 to 14 V

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

BC

OK

6

READ VALUE OF INTELLIGENT TESTER (PARKING BRAKE SWITCH)

- (a) Using the DATA LIST, check for proper functioning of the parking brake switch.

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
PARKING BRAKE SW	Parking brake switch / ON or OFF	ON: Parking brake applied OFF: Parking brake released	-

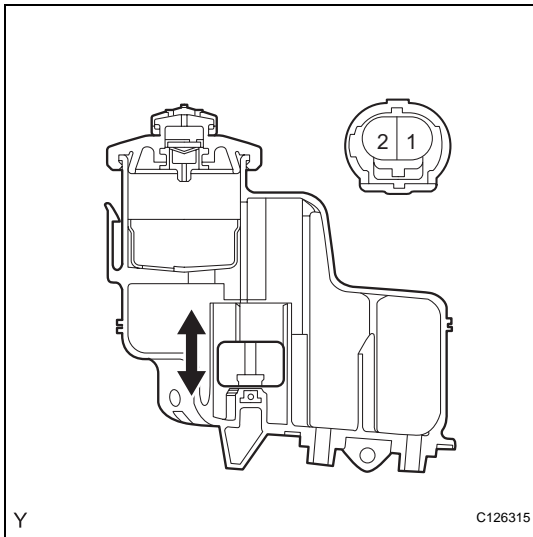
OK:
When the parking brake lever is operated, the display changes as shown above.

NG

Go to step 10

OK

7 INSPECT BRAKE FLUID LEVEL WARNING SWITCH



- Remove the reservoir tank cap and strainer.
- Disconnect the brake fluid level warning switch connector.
- Measure the resistance of the switch.

HINT:

A float is placed inside the reservoir. Its position can be changed by increasing or decreasing the brake fluid level.

Standard resistance

Tester Connection	Condition	Specified Condition
1 - 2	Float up (Switch OFF)	10 kΩ or higher
1 - 2	Float down (Switch ON)	Below 1 Ω

HINT:

If there is no problem after the above check is finished, adjust the brake fluid level to the MAX level.

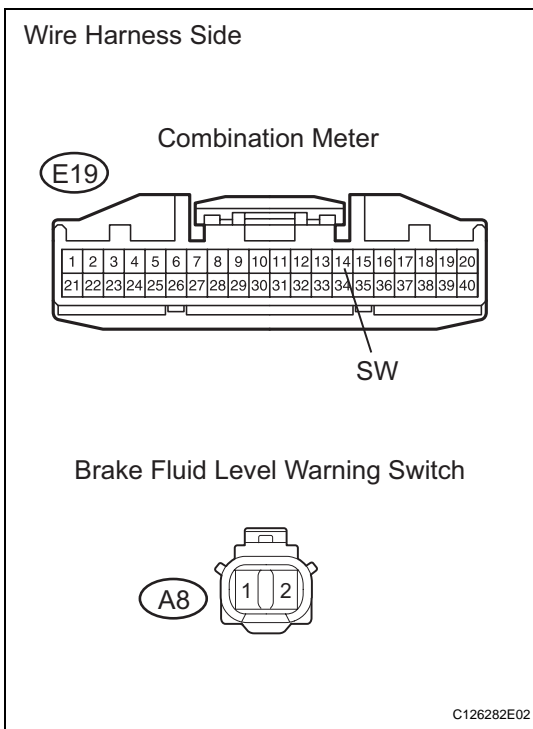
NG

REPLACE BRAKE MASTER CYLINDER
 RESERVOIR SUB-ASSEMBLY

BC

OK

8 CHECK WIRE HARNESS (LEVEL WARNING SWITCH - COMBINATION METER AND BODY GROUND)



- Disconnect the E19 combination meter connector.
- Disconnect the A8 switch connector.
- Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
E19-14 (SW) - A8-1	Below 1 Ω
E19-14 (SW) - Body ground	10 kΩ or higher
A8-2 - Body ground	Below 1 Ω

NG

REPAIR OR REPLACE HARNESS AND
 CONNECTOR

OK

9

INSPECT COMBINATION METER

(a) Inspect the combination meter (see page [ME-15](#)).

NG

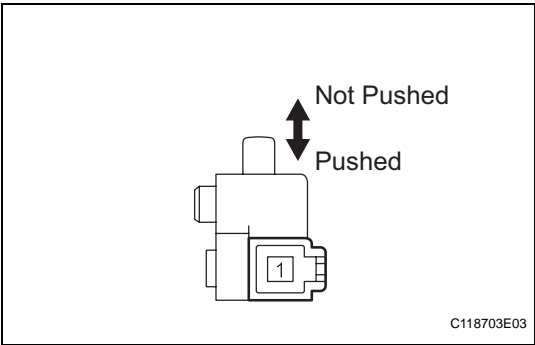
REPLACE COMBINATION METER

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

10

INSPECT PARKING BRAKE SWITCH ASSEMBLY



- (a) Remove the parking brake switch.
(b) Measure the resistance of the switch.

Standard resistance

Tester Connection	Condition	Specified Condition
1 - Body ground	Parking brake switch ON (Switch pin not pushed)	Below 1 Ω
1 - Body ground	Parking brake switch OFF (Switch pin pushed)	10 k Ω or higher

NG

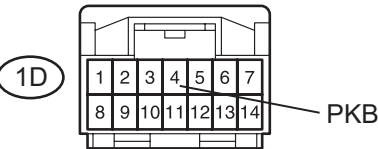
REPLACE PARKING BRAKE SWITCH ASSEMBLY

OK

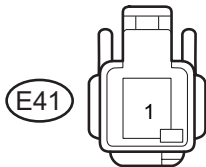
11 CHECK WIRE HARNESS (JUNCTION BLOCK - PARKING BRAKE SWITCH AND BODY GROUND)

Wire Harness Side

Instrument Panel Junction Block
(Main Body ECU)



Parking Brake Switch



C126283E02

- (a) Disconnect the 1D junction block connector.
- (b) Disconnect the E41 switch connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
1D-4 (PKB) - E41-1	Below 1 Ω
1D-4 (PKB) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

BC

REPLACE INSTRUMENT PANEL JUNCTION BLOCK

Brake Warning Light does not Come ON

WIRING DIAGRAM

Refer to the brake warning light circuit (see page [BC-145](#)).

INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

BC

2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (BRAKE WARNING LIGHT)

- (a) Select the ACTIVE TEST, generate a control command, and then check that BRAKE warning light operates.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
BRAKE WARN LAMP	Turns BRAKE warning light / ON or OFF	Observe combination meter

OK:

The BRAKE warning light turns on or off.

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

NG

3 INSPECT COMBINATION METER

- (a) Inspect the combination meter (see page [ME-15](#)).

NG

REPLACE COMBINATION METER

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

Slip Indicator Light Remains ON

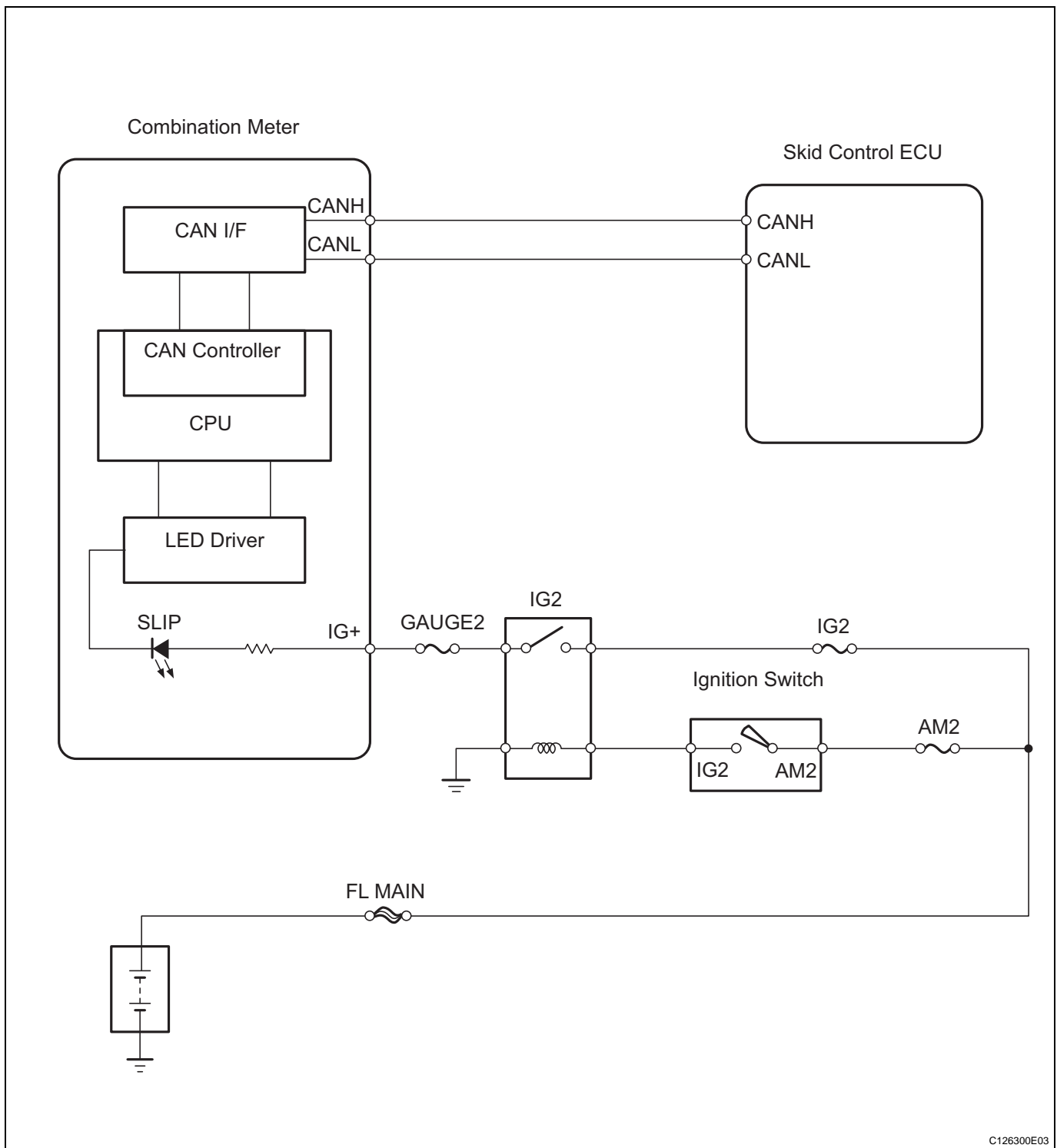
DESCRIPTION

The slip indicator blinks during VSC and/or TRC operation.

When the system fails, the slip indicator comes on to warn the driver.

For 2WD: With Auto LSD switch ON, when the hydraulic brake booster is at a high temperature, the slip indicator illuminates.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page [BC-24](#)).

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

2 CHECK SKID CONTROL ECU CONNECTOR

- (a) Check if the skid control ECU connector is securely connected.

OK:

The connector is securely connected.

NG

CONNECT CONNECTOR CORRECTLY

OK

3 CHECK COMBINATION METER

- (a) Check the combination meter (see page [ME-15](#)).

NG

REPLACE COMBINATION METER

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

Slip Indicator Light does not Come ON**DESCRIPTION**

Refer to the description of "Slip Indicator Light Remains ON" (see page [BC-152](#)).

WIRING DIAGRAM

Refer to the SLIP indicator light circuit (see page [BC-152](#)).

INSPECTION PROCEDURE**NOTICE:**

When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page [BC-24](#)).

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR CAN COMMUNICATION SYSTEM****A****2 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SLIP INDICATOR LIGHT)**

- (a) Using the intelligent tester's ACTIVE TEST, generate a control command, and then check that the SLIP indicator light operates.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
SLIP INDI LAMP	Turn slip indicator light ON / OFF	Observe combination meter

OK:

The SLIP indicator light turns ON and OFF.

NG**Go to step 3****OK****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****3 CHECK COMBINATION METER**

- (a) Inspect the combination meter (see page [ME-15](#)).

NG**REPLACE COMBINATION METER****BC**

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

Downhill Assist Control Indicator Light Remains ON

DESCRIPTION

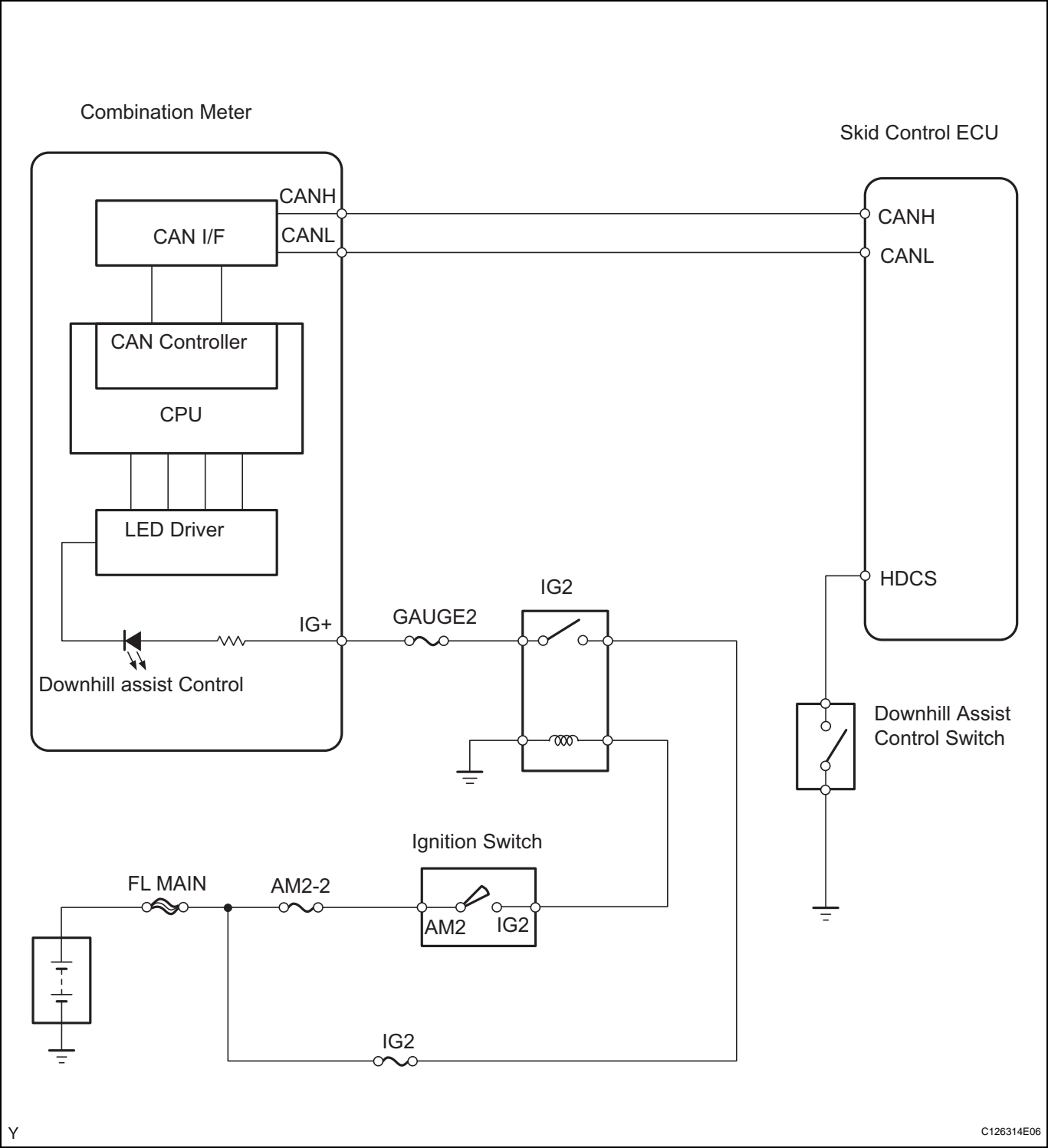
When the downhill assist control switch is pushed on, the downhill assist control function is available and the downhill assist control indicator light illuminates.

HINT:

Even if the downhill assist control switch is pressed, the downhill assist control indicator light will blink and downhill assist control will not be activated under the following conditions:

- Gear position is not L or R.
- The system is malfunctioning.
- Temperature of the hydraulic brake booster increases and downhill assist control is temporarily canceled.
- The vehicle speed is 25 km/h (15 mph) or more.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC not output	A
DTC output	B

B**REPAIR CAN COMMUNICATION SYSTEM****A****2 CHECK SKID CONTROL ECU CONNECTOR**

- (a) Check if the skid control ECU connector is securely connected.

OK:

The connector is securely connected.

BC**NG****CONNECT CONNECTOR CORRECTLY****OK****3 CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)**

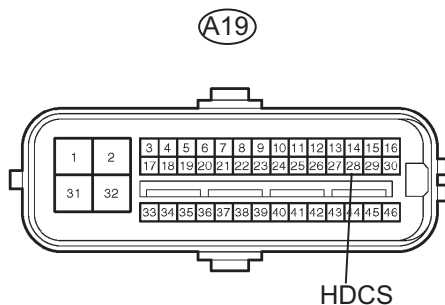
- (a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
A19-28 (HDCS) - Body ground	Downhill assist control switch is pushed	Below 1 Ω
A19-28 (HDCS) - Body ground	Downhill assist control switch is not pushed	10 k Ω or higher

OK**Go to step 6**

Wire Harness Side

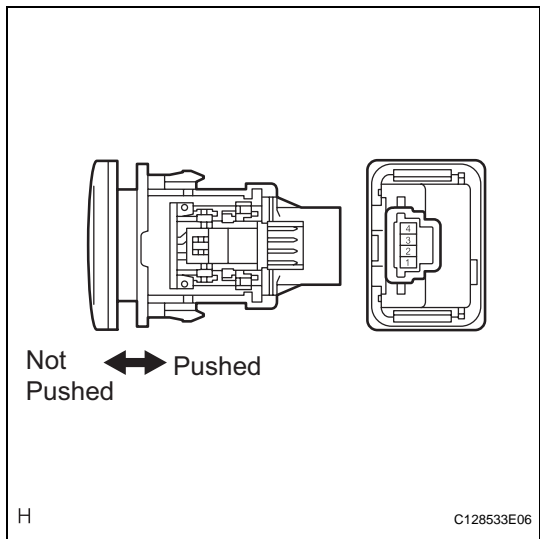


C121700E48

NG

4

INSPECT DOWNHILL ASSIST CONTROL SWITCH



- (a) Remove the downhill assist control switch.
- (b) Measure the resistance of the switch.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
1 - 4	Switch is pushed	Below 1 Ω
1 - 4	Switch is not pushed	10 kΩ or higher

NG

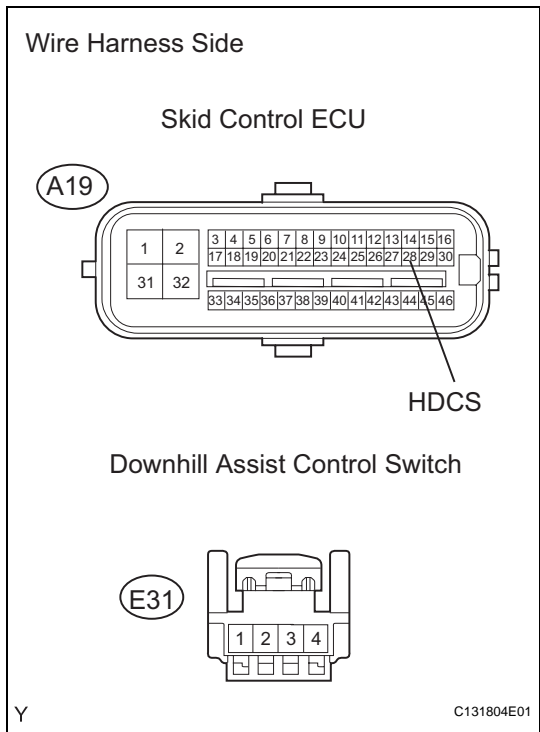
REPLACE DOWNHILL ASSIST CONTROL SWITCH

OK

BC

5

CHECK WIRE HARNESS (CONTROL SWITCH - SKID CONTROL ECU AND BODY GROUND)



- (a) Disconnect the A19 ECU connector.
- (b) Disconnect the E31 switch connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A19-28 (HDCS) - E31-4	Below 1 Ω
E31-1 - Body ground	Below 1 Ω
A19-28 (HDCS) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

6

CHECK COMBINATION METER

- (a) Check the combination meter (see page ME-15).

A rectangular box with a pointed right side, containing the text "NG".

NG

A rectangular box containing the text "REPLACE COMBINATION METER".

REPLACE COMBINATION METER

A rectangular box with a pointed bottom side, containing the text "OK".

OK

A rectangular box containing the text "REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY".

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

Downhill Assist Control Indicator Light does not Come ON

DESCRIPTION

Refer to the description of "Downhill Assist Control Indicator Light Remains ON" (see page [BC-156](#)).

WIRING DIAGRAM

Refer to the downhill assist control indicator light circuit (see page [BC-157](#)).

INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#))

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

2 READ VALUE OF INTELLIGENT TESTER (DOWNHILL ASSIST CONTROL SWITCH)

- (a) Check the DATA LIST for proper functioning of the downhill assist control switch.

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
Downhill assist control SW	Downhill assist control switch / ON or OFF	ON: Downhill assist control switch is ON OFF: Downhill assist control switch is OFF	-

OK:

ON (downhill assist control switch is ON) appears on the screen.

NG

Go to step 5

OK

3 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (DAC INDICATOR LIGHT)

- (a) Select the ACTIVE TEST, generate a control command, and then check that the downhill assist control indicator light operates.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
Downhill assist control INDI LAMP	Turn downhill assist control indicator light ON / OFF	Observe combination meter

OK:

The downhill assist control indicator light turns ON and OFF.

OK**REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****NG****4****INSPECT COMBINATION METER**

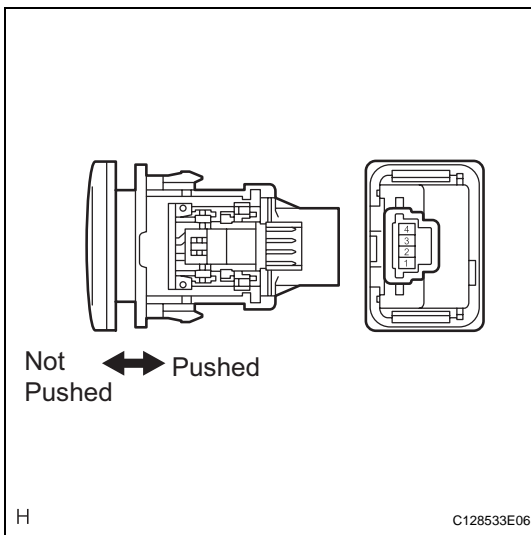
(a) Inspect the combination meter (see page [ME-15](#)).

NG**REPLACE COMBINATION METER ASSEMBLY****OK****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY****5****INSPECT DOWNHILL ASSIST CONTROL SWITCH****BC**

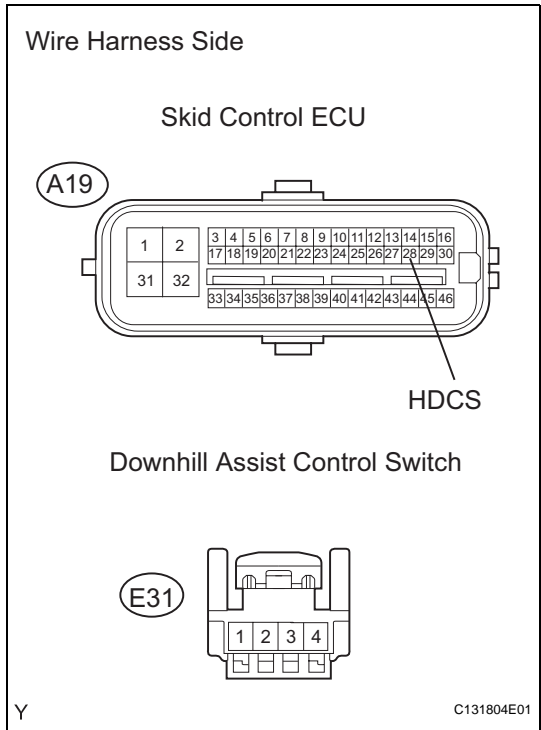
- (a) Remove the downhill assist control switch.
(b) Measure the resistance of the switch.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
4 - 1	Switch is pushed	Below 1 Ω
4 - 1	Switch is not pushed	10 k Ω or higher

NG**REPLACE DOWNHILL ASSIST CONTROL SWITCH****OK**

6
 CHECK WIRE HARNESS (CONTROL SWITCH - SKID CONTROL ECU AND BODY GROUND)



- (a) Disconnect the A19 ECU connector.
- (b) Disconnect the E31 switch connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A19-28 (HDCS) - E31-4	Below 1 Ω
E31-1 - Body ground	Below 1 Ω
A19-28 (HDCS) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

AUTO LSD Indicator Light Remains ON

DESCRIPTION

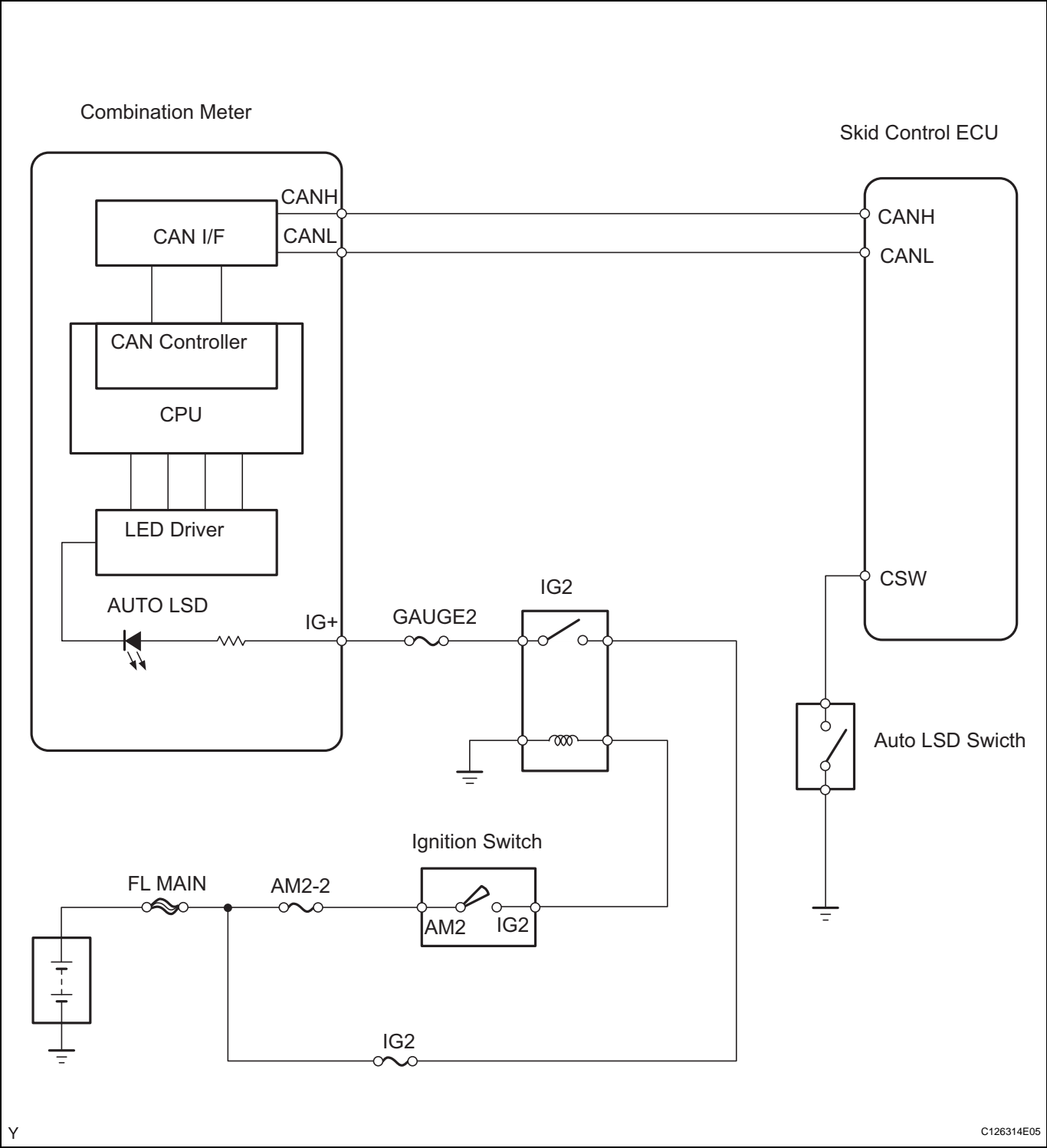
This is the auto LSD switch for 2WD. When the auto LSD switch is pushed on, the auto LSD function is available and the auto LSD indicator light illuminates.

HINT:

The auto LSD does not operate even if the auto LSD switch is pressed under the following conditions:

- The TRC or VSC system is faulty.
- The temperature inside the hydraulic brake booster increases and the auto LSD operation is suspended.

WIRING DIAGRAM



INSPECTION PROCEDURE

1	CHECK CAN COMMUNICATION SYSTEM
---	--------------------------------

(a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

OK:

The connector is securely connected.

B**REPAIR CAN COMMUNICATION SYSTEM****A****2****CHECK SKID CONTROL ECU CONNECTOR**

- (a) Check if the skid control ECU connector is securely connected.

OK:

The connector is securely connected.

NG**CONNECTOR CORRECTLY****OK****3****CHECK WIRE HARNESS (SKID CONTROL ECU - BODY GROUND)**

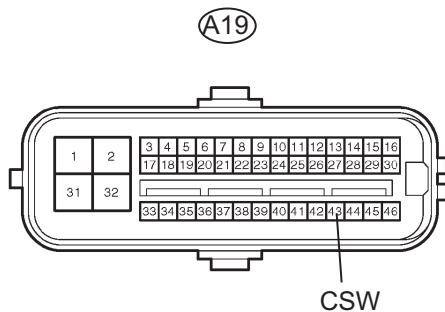
- (a) Disconnect the A19 ECU connector.
(b) Measure the resistance of the wire harness side connector.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
A19-43 (CSW) - Body ground	AUTO LSD switch is not pushed	10 k Ω or higher
A19-43 (CSW) - Body ground	AUTO LSD switch is pushed	Below 1 Ω

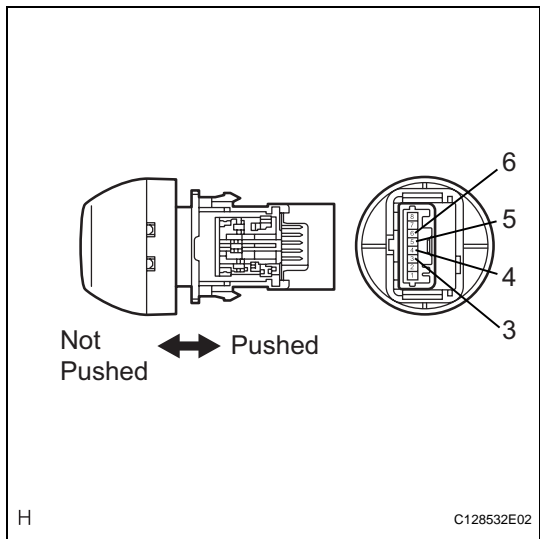
OK**Go to step 6**

Wire Harness Side

**NG****BC**

4

INSPECT AUTO LSD SWITCH



- (a) Remove the auto LSD switch.
 - (b) Measure the resistance of the switch.
- Standard resistance**

Tester Connection	Switch Condition	Specified Condition
3 - 6	Not pushed	10 kΩ or higher
3 - 6	Pushed	Below 1Ω

NG

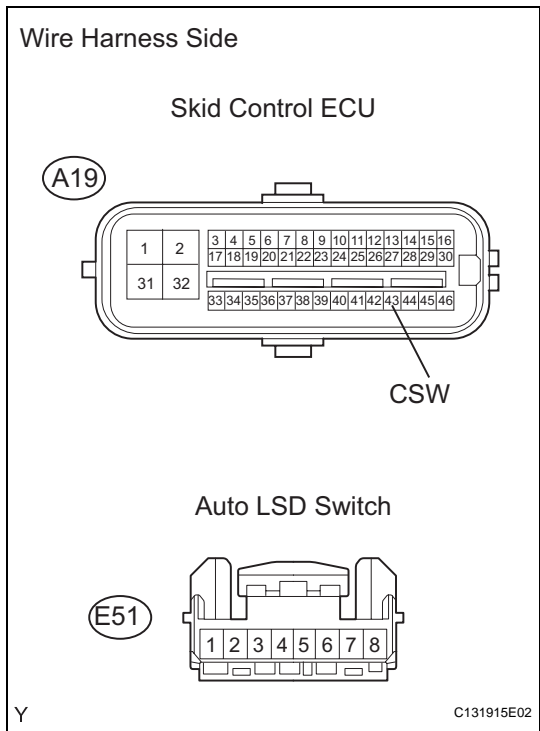
REPLACE TRACTION CONTROL SWITCH

OK

BC

5

CHECK WIRE HARNESS (SKID CONTROL ECU - TRACTION CONTROL SWITCH)



- (a) Disconnect the A19 ECU connector.
 - (b) Disconnect the E51 switch connector.
 - (c) Measure the resistance of the wire harness side connectors.
- Standard resistance**

Tester Connection	Specified Condition
A19-43 (CSW) - E51-6	Below 1 Ω
E51-3 - Body ground	Below 1 Ω
A19-43 (CSW) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

6

CHECK COMBINATION METER

- (a) Check the combination meter (see page ME-15).

NG

**REPLACE COMBINATION METER
ASSEMBLY**

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

BC

AUTO LSD Indicator Light does not Come ON

DESCRIPTION

Refer to the description of "AUTO LSD Indicator Light Remains ON" (see page [BC-164](#)).

WIRING DIAGRAM

Refer to the AUTO LSD indicator light circuit (see page [BC-165](#)).

INSPECTION PROCEDURE

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication system DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

A

B

REPAIR CAN COMMUNICATION SYSTEM

2 READ VALUE OF INTELLIGENT TESTER (AUTO LSD SWITCH)

- (a) Check the Data List for proper functioning of the Auto LSD switch.

Skid control ECU

Item (Display)	Measurement Item / Range (Display)	Normal Condition	Diagnostic Note
AUTO LSD SW	Auto LSD switch (AUTO LSD switch) / ON or OFF	ON: Auto LSD switch is ON OFF: Auto LSD switch is OFF	-

OK:

ON (downhill assist control switch is ON) appears on the screen.

NG

Go to step 5

OK

3 PERFORM ACTIVE TEST BY INTELLIGENT TESTER (AUTO LSD INDICATOR LIGHT)

- (a) Select the ACTIVE TEST, generate a control command, and then check that the AUTO LSD indicator light operates.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
AUTO LSD LAMP	Turn AUTO LSD indicator light ON / OFF	Observe combination meter

OK:

The AUTO LSD indicator light turns ON and OFF.

NG

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

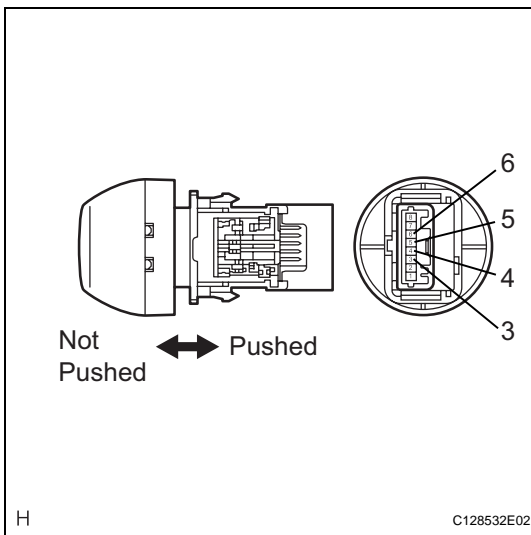
OK

4 INSPECT COMBINATION METER ASSEMBLY(a) Inspect the combination meter (see page [ME-15](#)).

NG

REPLACE COMBINATION METER ASSEMBLY

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**5 INSPECT AUTO LSD SWITCH**

(a) Disconnect the auto LSD switch switch.

(b) Measure the resistance of the switch.

Standard resistance

Tester Connection	Switch Condition	Specified Condition
3 - 6	Not pushed	10 k Ω or higher
3 - 6	Pushed	Below 1 Ω

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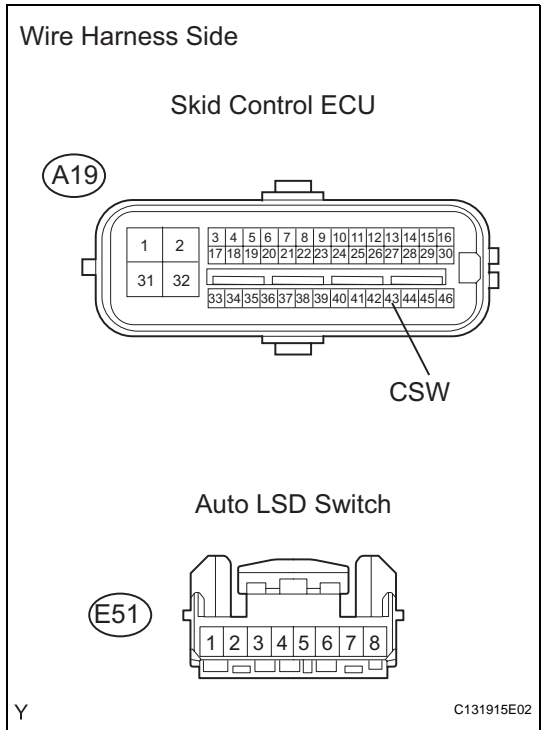
REPLACE AUTO LSD SWITCH

OK

BC

6

CHECK WIRE HARNESS (AUTO LSD SWITCH - SKID CONTROL ECU AND BODY GROUND)



- (a) Disconnect the A19 ECU connector.
- (b) Disconnect the E51 switch connector.
- (c) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
A19-43 (CSW) - E51-6	Below 1 Ω
E51-3 - Body ground	Below 1 Ω
A19-43 (CSW) - Body ground	10 kΩ or higher

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REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

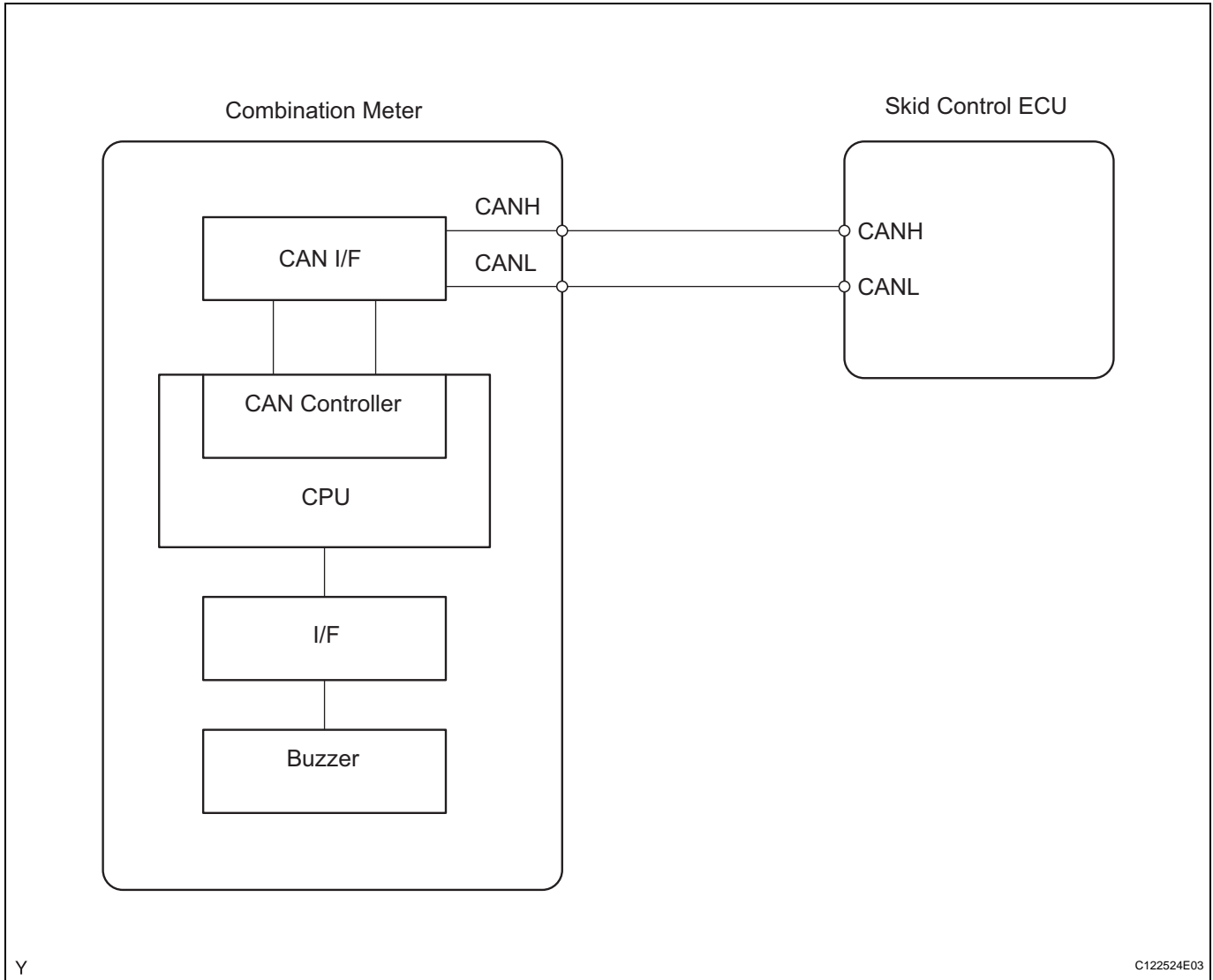
REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

Skid Control Buzzer Circuit

DESCRIPTION

The skid control buzzer sounds while the VSC is activated.

WIRING DIAGRAM



BC

INSPECTION PROCEDURE

NOTICE:

When replacing the ABS and TRACTION actuator, perform the zero point calibration (see page [BC-24](#)).

1 CHECK CAN COMMUNICATION SYSTEM

- (a) Check if the CAN communication DTC is output (see page [CA-34](#)).

Result

Result	Proceed to
DTC is not output	A

Result	Proceed to
DTC is output	B

B

REPAIR CAN COMMUNICATION SYSTEM

A

2

PERFORM ACTIVE TEST BY INTELLIGENT TESTER (SKID CONTROL BUZZER)

- (a) Select the ACTIVE TEST, generate a control command, and then check that the skid control buzzer operate.

Skid control ECU

Item (Display)	Test Details	Diagnostic Note
BUZZER	Turns skid control buzzer ON / OFF	Buzzer can be heard

OK:
The skid control buzzer can be heard.

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

NG

3

INSPECT COMBINATION METER

- (a) Inspect the combination meter (see page [ME-15](#)).

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REPLACE COMBINATION METER

OK

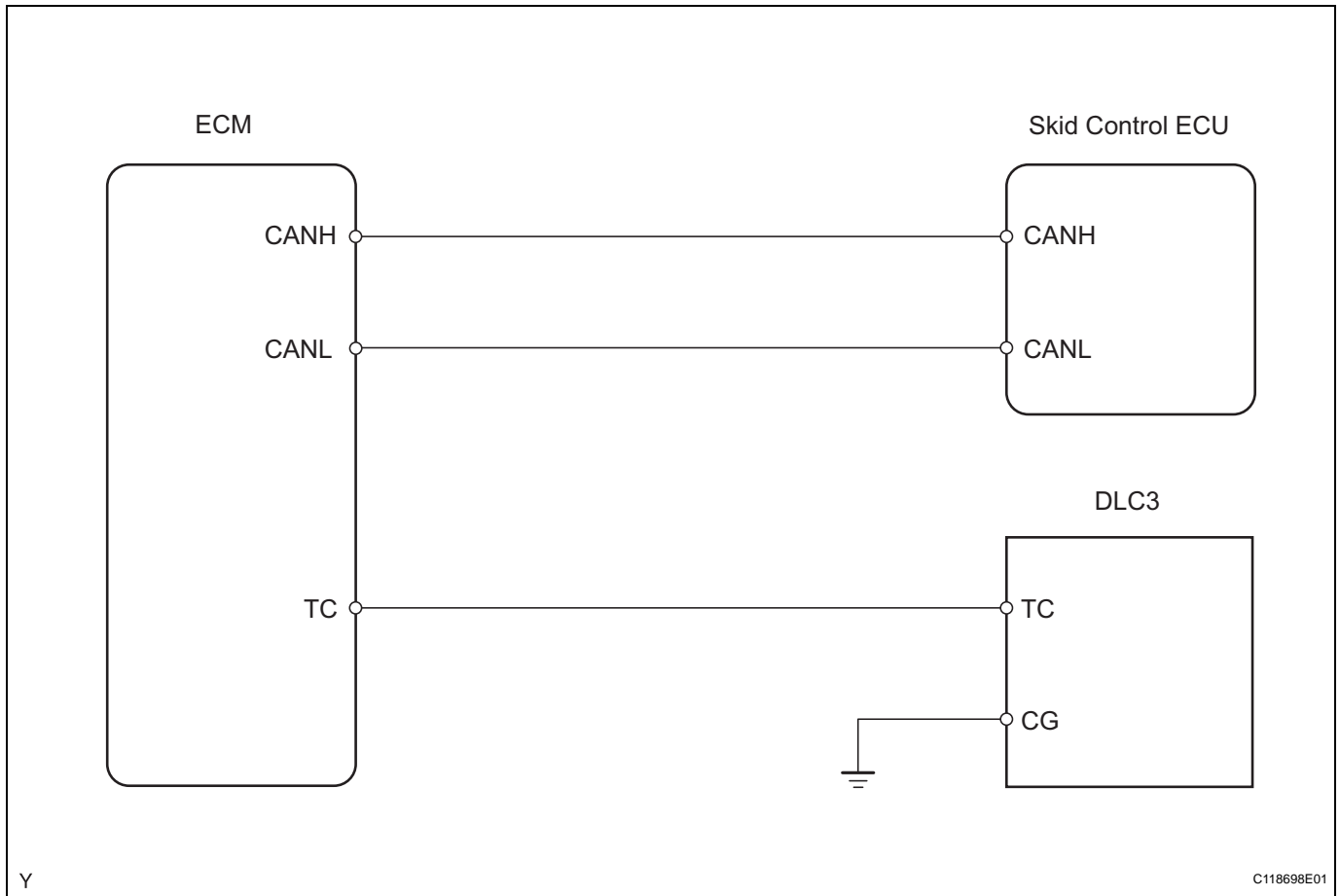
REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

TC and CG Terminal Circuit

DESCRIPTION

Connecting terminals TC and CG of the DLC3 causes the skid control ECU to display 2-digit DTCs by flashing the ABS warning light.

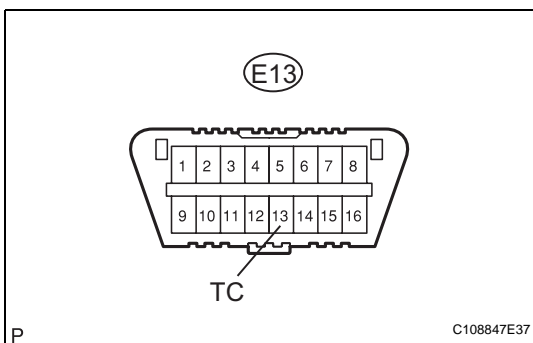
WIRING DIAGRAM



BC

INSPECTION PROCEDURE

1 CHECK DLC3 (TC VOLTAGE)



- Turn the ignition switch ON.
- Measure the voltage of the DLC3.

Standard voltage

Tester Connection	Specified Condition
E13-13 (TC) - Body ground	10 to 14 V

NG

Go to step 3

OK

2

CHECK CAN COMMUNICATION SYSTEM

(a) Check the DTC (see page CA-34).

Result

Result	Proceed to
DTC is not output	A
DTC is output	B

B

REPAIR CIRCUIT INDICATED BY OUTPUT DTC

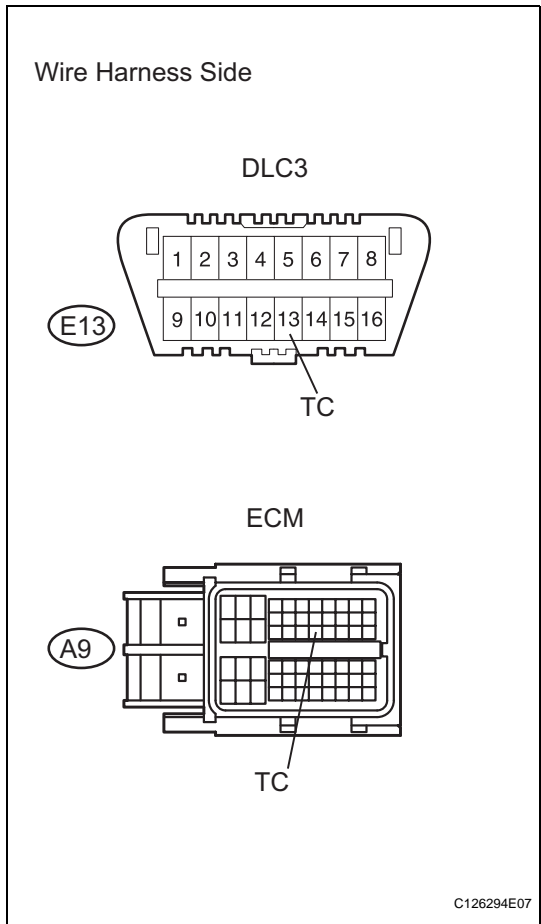
A

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY

3

CHECK WIRE HARNESS (DLC3 - ECM AND BODY GROUND)

BC



- (a) Turn the ignition switch OFF.
- (b) Disconnect the A12 ECM connector.
- (c) Measure the resistance of the wire harness side connectors.

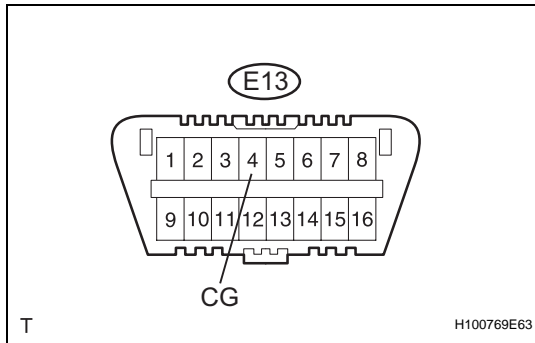
Standard resistance

Tester Connection	Specified Condition
E13-13 (TC) - A9-27 (TC)	Below 1 Ω
A9-27 (TC) - Body ground	10 k Ω or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

4 CHECK WIRE HARNESS (DLC3 - BODY GROUND)

(a) Measure the resistance of the DLC3.

Standard resistance

Tester Connection	Specified Condition
E13-4 (CG) - Body ground	Below 1 Ω

NG**REPAIR OR REPLACE HARNESS AND CONNECTOR****OK****5 CHECK CAN COMMUNICATION SYSTEM**(a) Check if the CAN communication DTC is output (see page [CA-34](#)).**Result**

Result	Proceed to
DTC is not output	A
DTC is output	B

B**REPAIR CIRCUIT INDICATED BY OUTPUT DTC****A****BC****REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY**

TS and CG Terminal Circuit

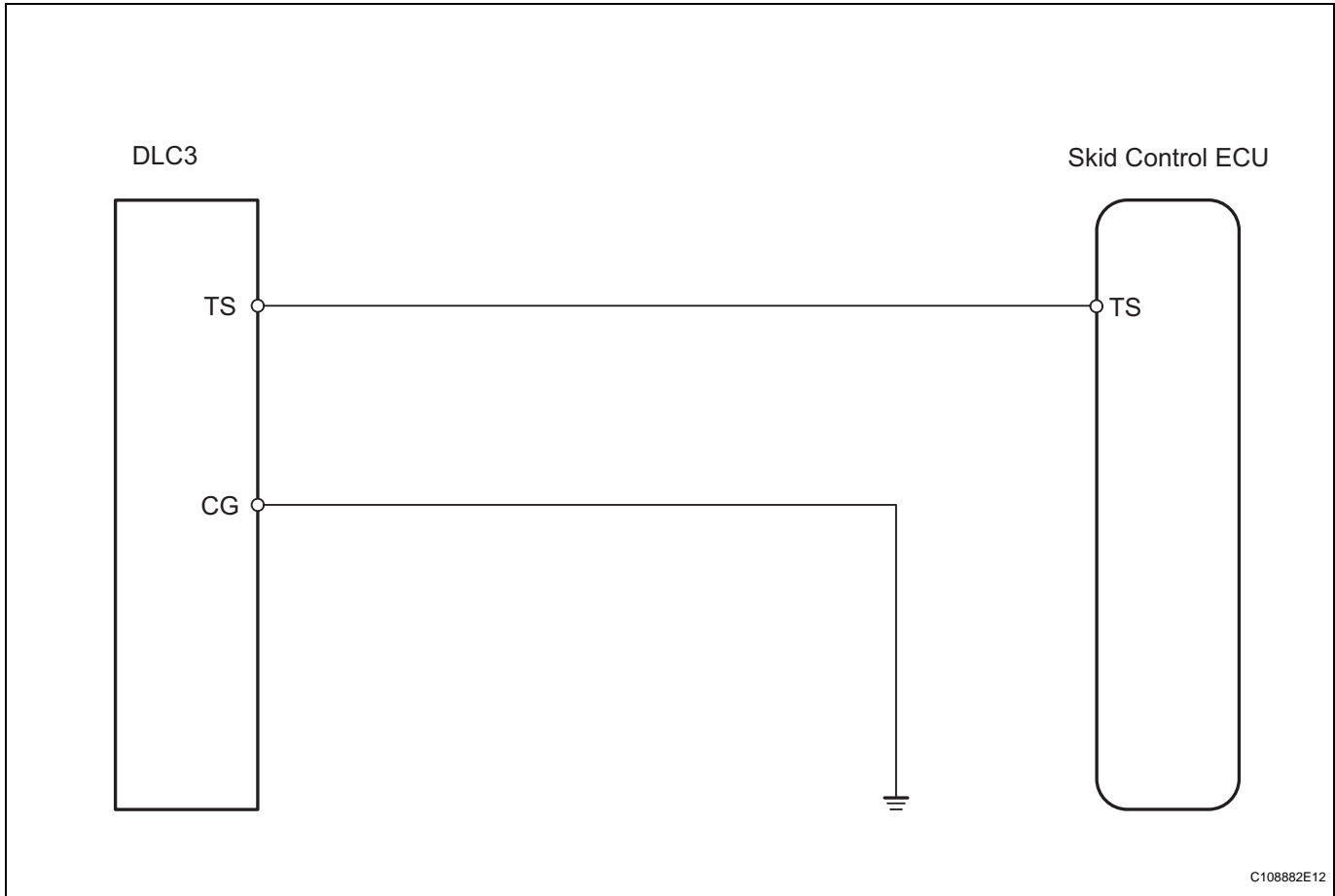
DESCRIPTION

If the vehicle is stationary during sensor check mode, speed sensor malfunctions cannot be detected. The vehicle must be driven for speed sensor malfunctions to be detected.

HINT:

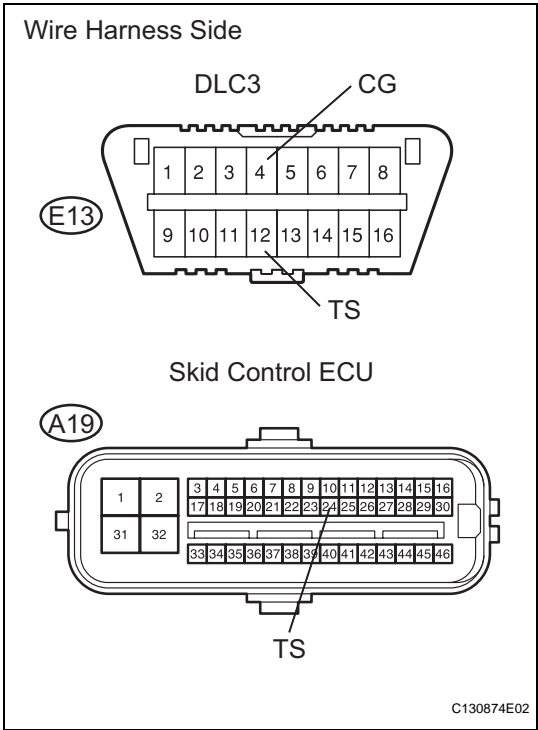
Change to sensor check mode by connecting terminals TC and CG of the DLC3, and turning the ignition switch from OFF to ON.

WIRING DIAGRAM



INSPECTION PROCEDURE

1 CHECK WIRE HARNESS (DLC3 - SKID CONTROL ECU AND BODY GROUND)



- (a) Disconnect the A27 ECU connector.
 (b) Measure the resistance of the wire harness side connectors.

Standard resistance

Tester Connection	Specified Condition
E13-4 (CG) - Body ground	Below 1 Ω
E13-12 (TS) - A19-15 (TS)	Below 1 Ω
A19-15 (TS) - Body ground	10 kΩ or higher

NG

REPAIR OR REPLACE HARNESS AND CONNECTOR

OK

REPLACE ABS AND TRACTION ACTUATOR ASSEMBLY